Choose the Right Hardware

Proposal

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.

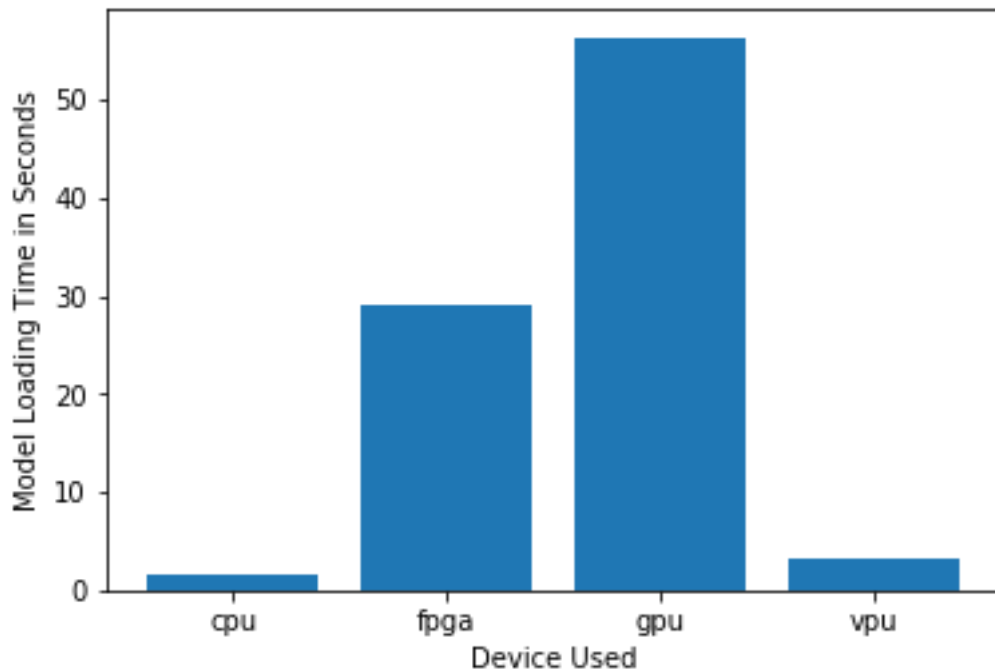| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
|---|
| *FPGA* |

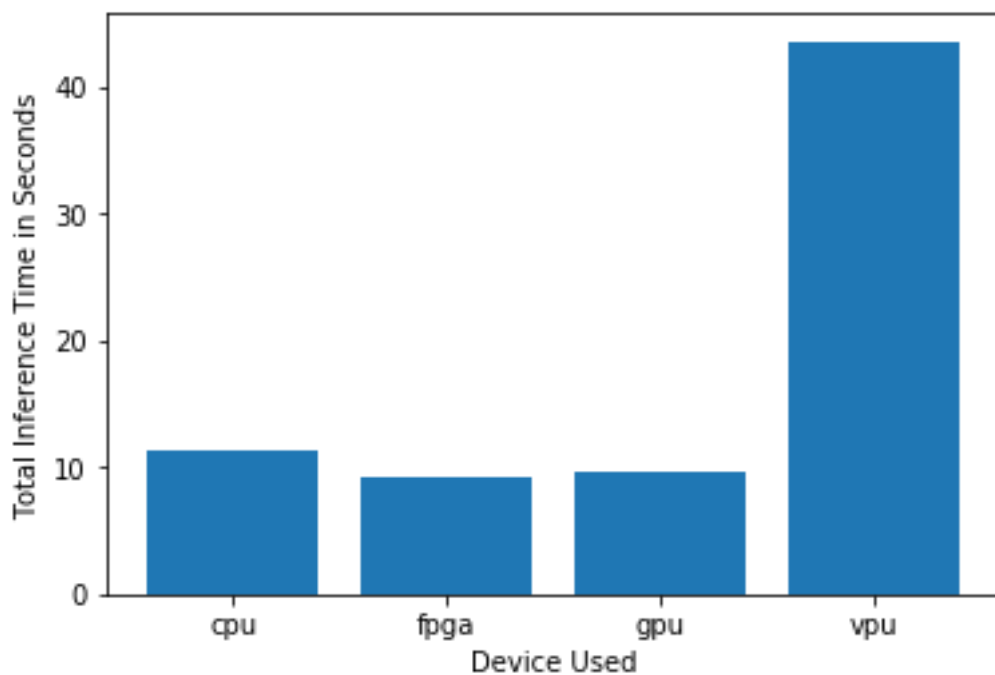| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
The client requires to process video at 30-35 FPS	*FPGA have a high processing rate.*
The system would need to be able to run inference on the video stream very quickly.	*FPGA perform inference very fast.*
The system would also need to be flexible so that it can be reprogrammed and optimized	*FPGAs are reprogrammable e customizable to best performance.*
Naomi Semiconductors has plenty of revenue to install a quality system	*They have a good budget to spend acquiring hardware.*

Queue Monitoring Requirements

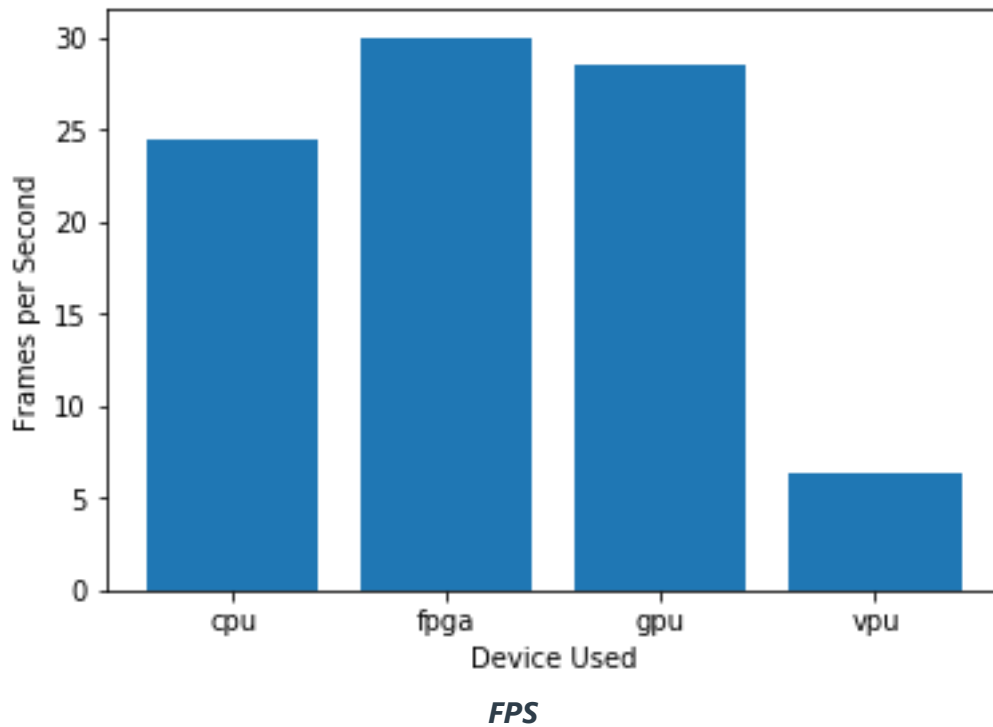| Maximum number of people in the queue	5
Model precision chosen (FP32, FP16, or Int8)	*FP16*

Test Results

UDACITY

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

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
In relation to loading time the CPU was the fastest while the GPU was the slowest. The FGPA had an intermediate value between the two. In relation to Inference time the FPGA was the fastest while the VPU had the worst performance. In relation to FPS the FPGA showed the best FPS rate. Since the client wanted a system that would be able to run inference on the video stream very quickly and would also be flexible so that it can be reprogrammed and optimized and they have a good budget to spend the 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.

U U D A C I T Y

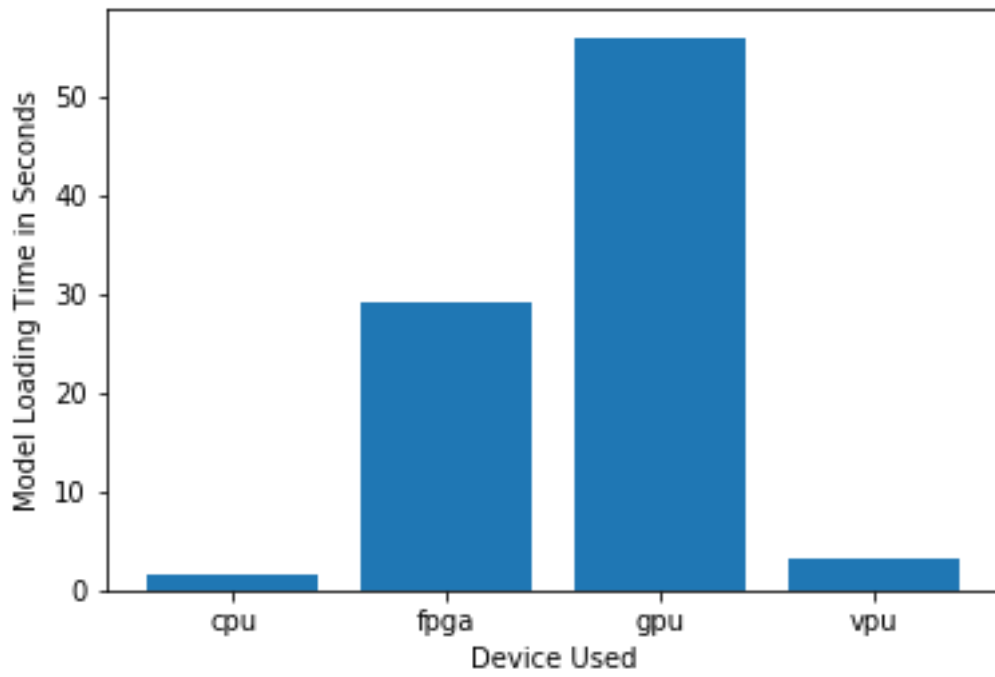| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
|---|
| *CPU* |

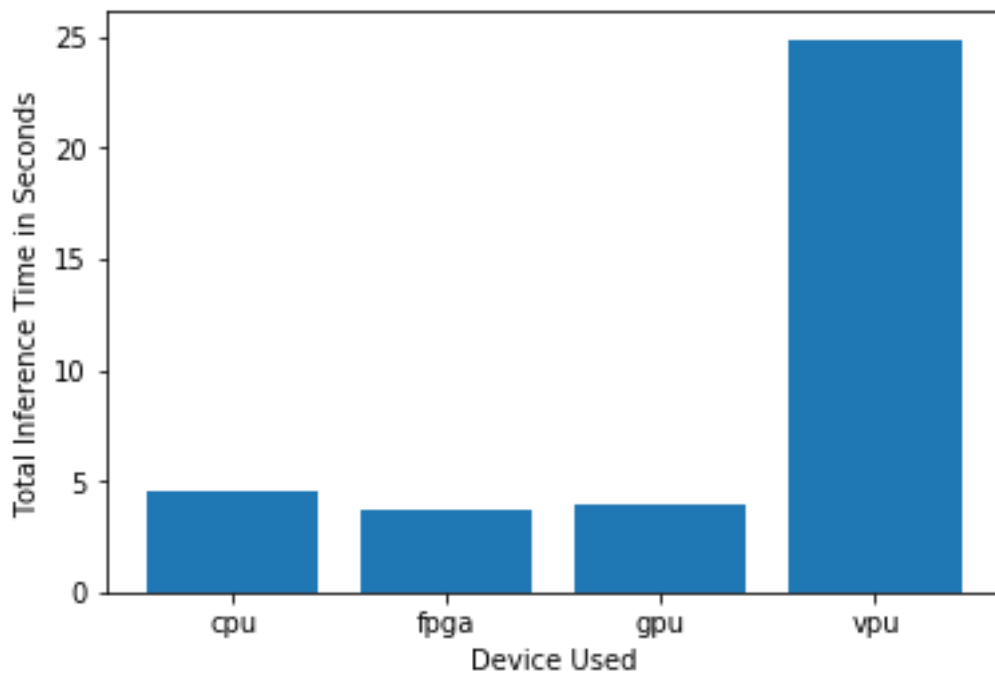| Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Processors are only used to carry out some minimal tasks that are not computationally expensive.	*There is computational space to use the CPUs*
Mr. Lin does not have much money to invest in additional hardware	Currently these processors are only used to carry out some minimal tasks so it can be used the existing ones
Save as much as possible on his electric bill.	*No extra hardware for electric consumption.*

Queue Monitoring Requirements

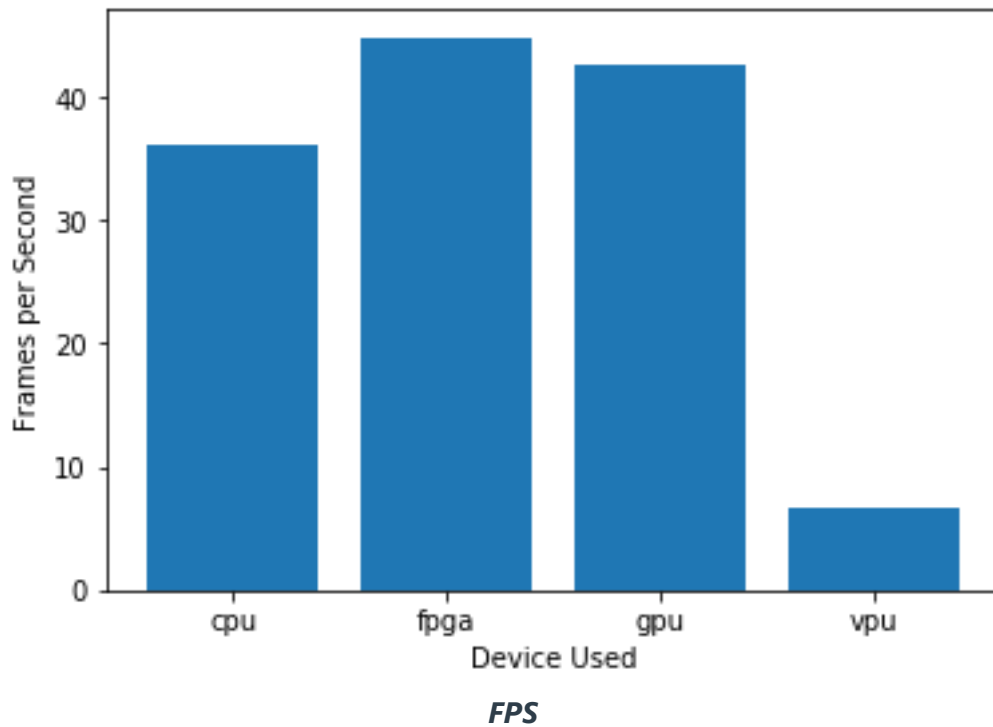| Maximum number of people in the queue	*5*
Model precision chosen (FP32, FP16, or Int8)	*FP32*

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).

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
In relation to loading time the CPU was the fastest while the GPU was the slowest. In relation to Inference time the FPGA was the fastest while the VPU had the worst performance. In relation to FPS the FPGA showed the best FPS rate followed by GPU and CPU. Since the client did not wanted to invest money in additional hardware and he wanted to save as much as possible on his electric bill and processors are being only used to carry out some minimal tasks the best choice is to use the existing CPUs.

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

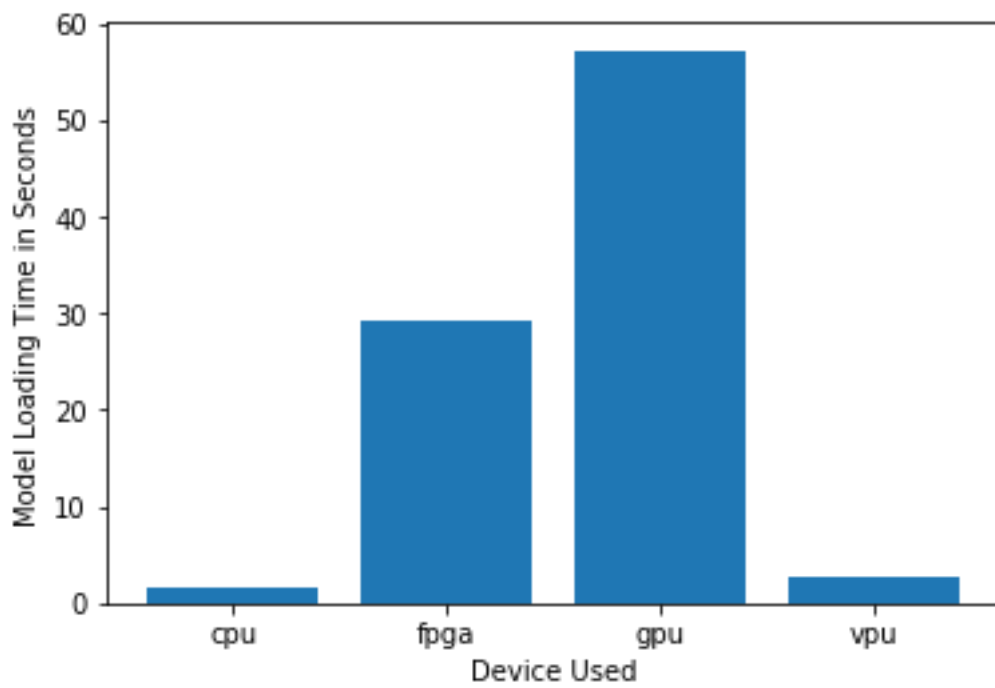| Which hardware might be most appropriate for this scenario? (CPU / IGPU / VPU / FPGA) |
|---|
| *VPU* |

Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Save as much as possible both on hardware and future power requirements.	*Do not require much power to run.*
Budget allows for a maximum of $300 per machine	*VPU fits in this cost range.*

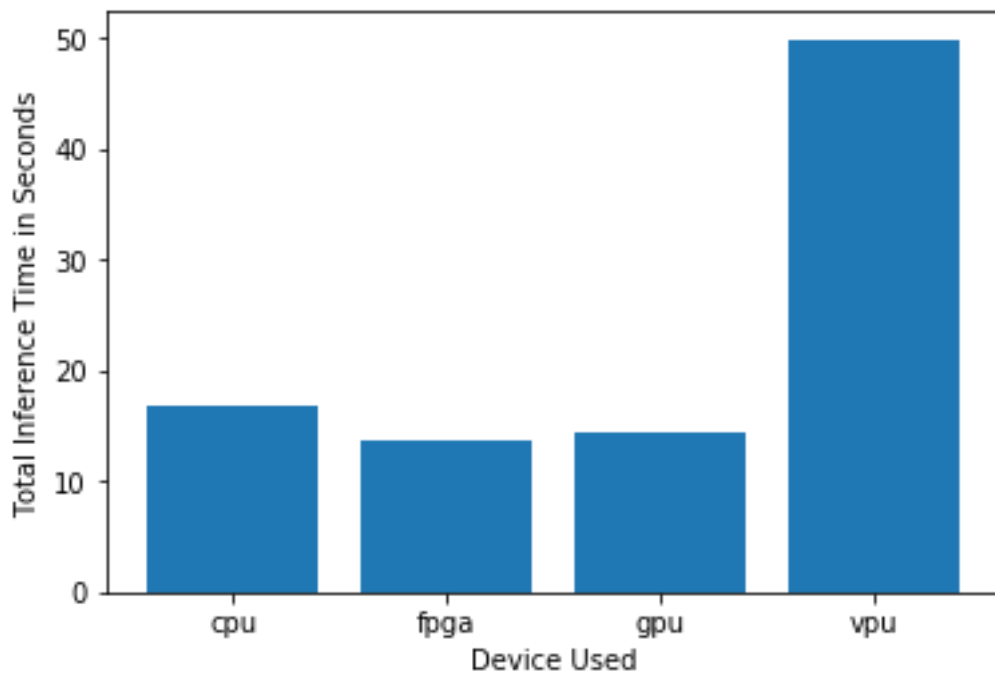## Queue Monitoring Requirements

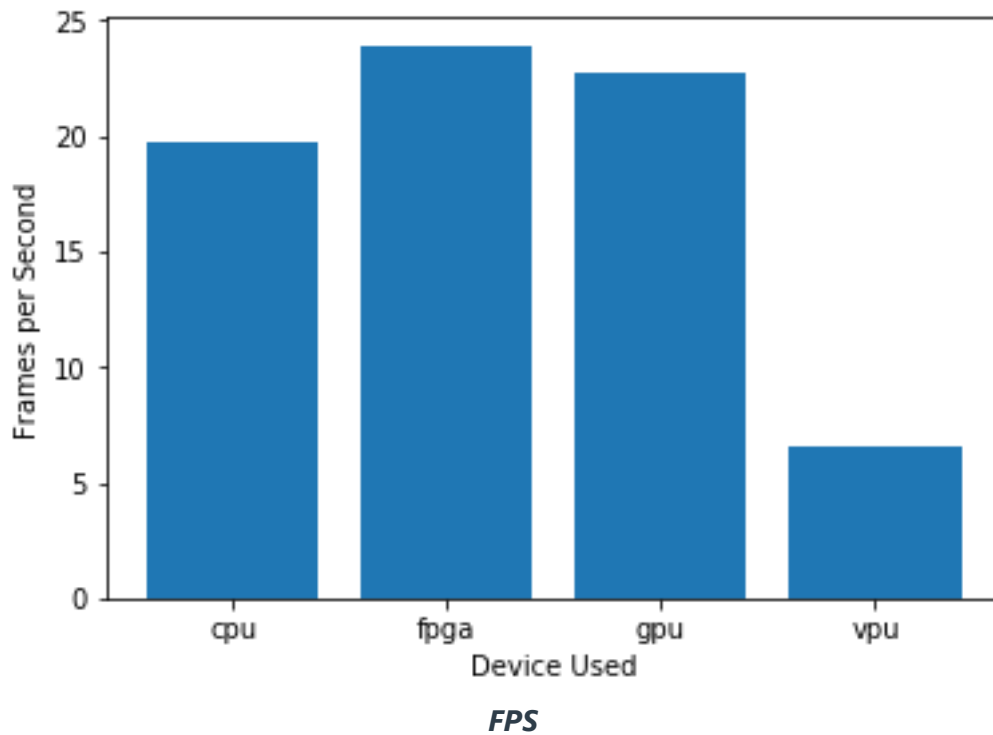|	
Maximum number of people in the queue	*15*
Model precision chosen (FP32, FP16, or Int8)	*FP16*

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).

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
In relation to loading time the CPU was the fastest while the GPU was the slowest. In relation to Inference time the FPGA was the fastest while the VPU had the worst performance. In relation to FPS the FPGA showed the best FPS rate followed by GPU and CPU. Since the budget allowed is a maximum of $300 per machine and it is required to save as much as possible both on hardware and future power requirements the VPU has a satisfactory performance and it is the best choice.