

# 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)

Based in the the scenario FPGA is most advisable because he needs a flexible programmable and 24 hours running and long life.

Manufacturing CPU

No. of People in Queue 1 is 1  
No. of People in Queue 2 is 2  
Person: 88.8%  
No. of Total People 7



Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
<i>Example requirement:</i> The client requires a tiny device to be connected to their CPU—and their budget is only about \$100 for each device.	<i>Example explanation:</i> VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
The client requires to be able to detect chip flaws without slowing down the packaging process, the system would need to be able to run inference on the video stream very quickly and 24 hours	<i>FPGA can works continuously running 24 hours a day and long life and are very powerful.</i>

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 to quickly detect flaws in different chip designs.	<i>FPGA are flexible to be programmable.</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.	<i>FPGA are the most sophisticated hardware and it cost more but it has a long life .</i>

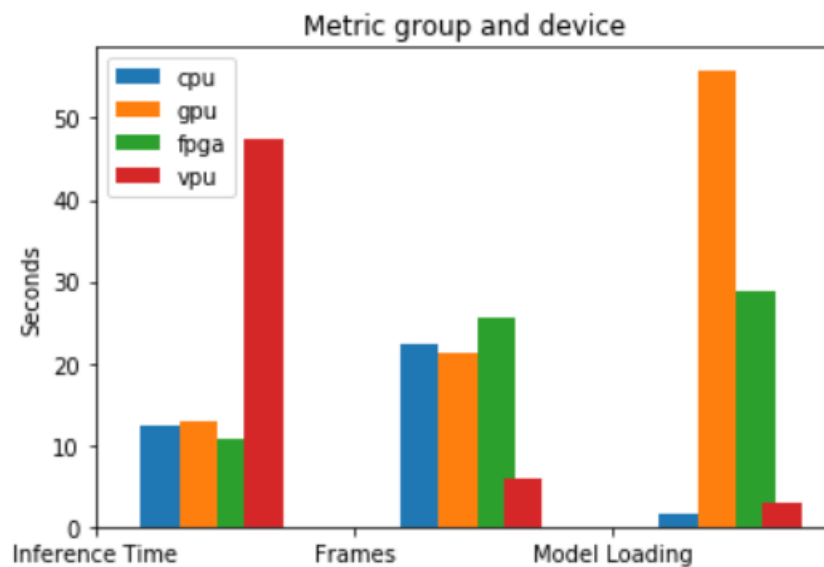
## Queue Monitoring Requirements

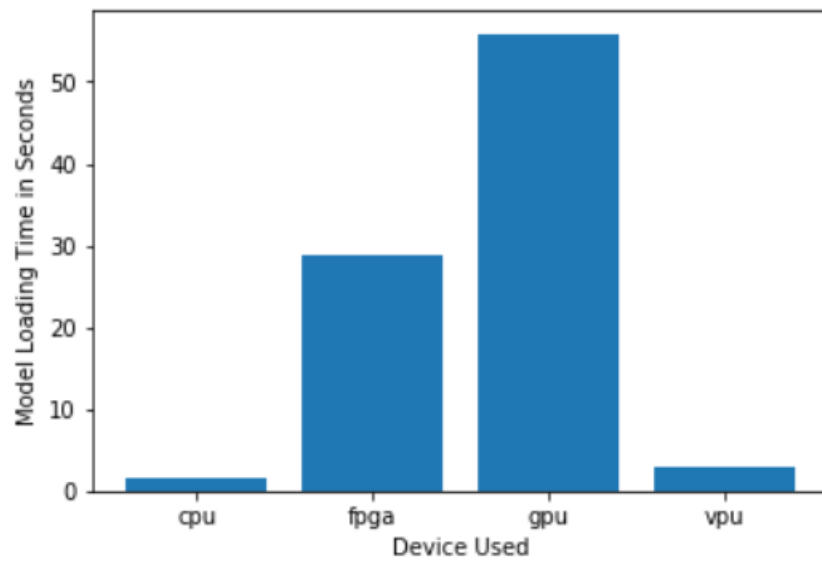
Maximum number of people in the queue	4
Model precision chosen (FP32, FP16, or Int8)	FP32

## Test Results

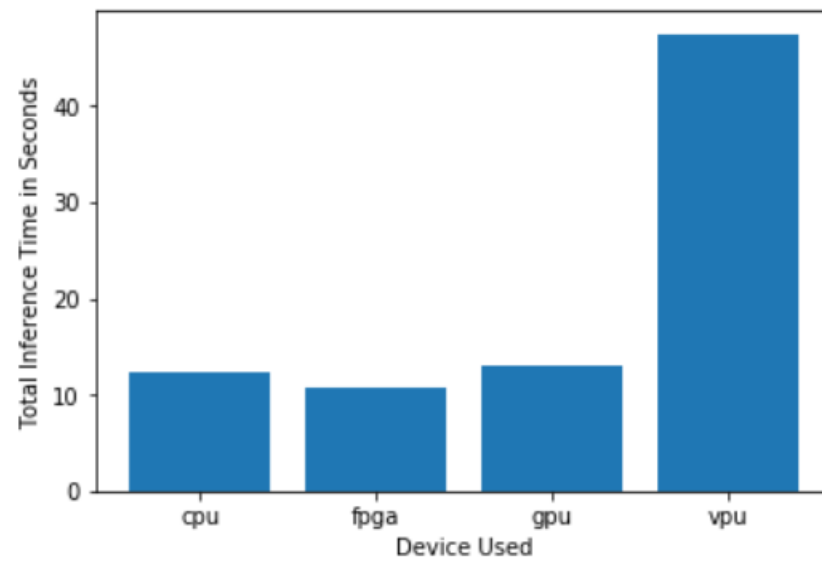
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).

Checking on the metrics we see that the less inference time is for FPGA. The time to generate an output for a single image. FPGA is the best hardware to manage more Frames in this case we have around 25 frames per second. We can also see that CPU takes less seconds and for loading the model.

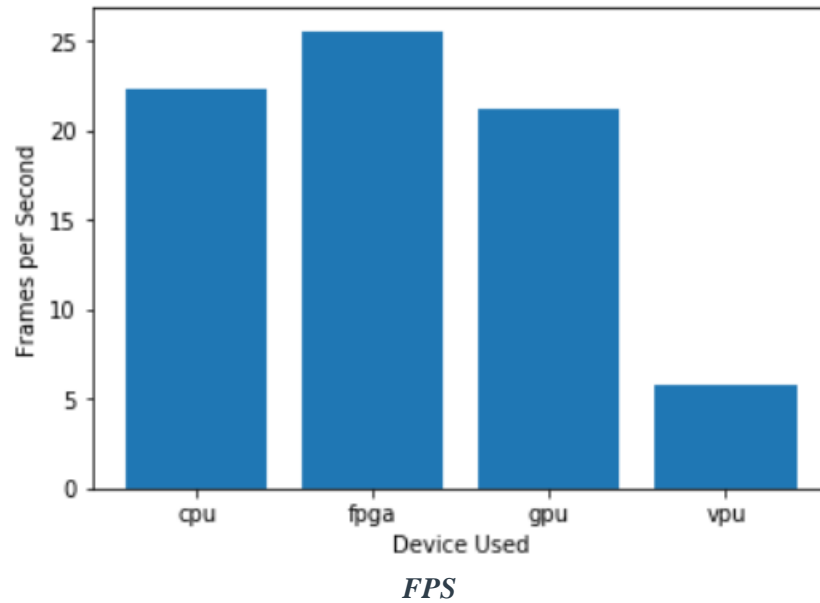




*Model Load Time*



*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

*Based in the information of the client* to be flexible so that it can be reprogrammable, last for at least 5-10 years. The best recommendation is FPGA.

## Retail FPGA



## 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)

*As the client already has the enough necessary hardware Intel i7 CPU in the store's checkout. We can use that to reduce extra cost. besides we can use IGPU if we need it.*

Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
<p><i>Example requirement:</i> The client requires a tiny device to be connected to their CPU—and their budget is only about \$100 for each device.</p>	<p><i>Example explanation:</i> VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.</p>
<p>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.</p>	<p><i>As we already have Intel i7 CPU we can use this to reduce additional cost hardware.</i></p>

Mr. Lin does not have much money to invest in additional hardware, and also would like to save as much as possible on his electric bill.	<i>We can reuse the intel i7 CPU</i>
Mr. Lin believes this problem can be easily solved by directing people to less-congested queues in the store, and he is interested in using an Edge AI system to do so.	CPU can handle one process very well

## Queue Monitoring Requirements

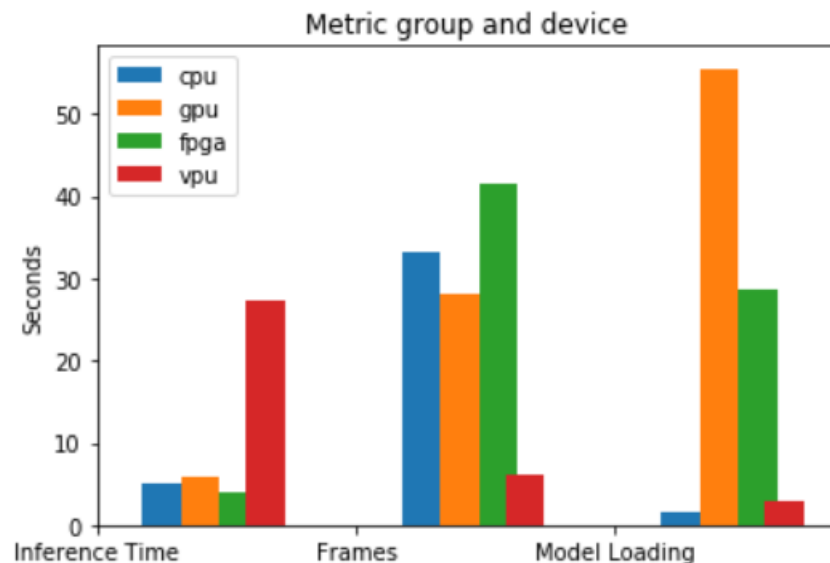
Maximum number of people in the queue	4
Model precision chosen (FP32, FP16, or Int8)	FP32

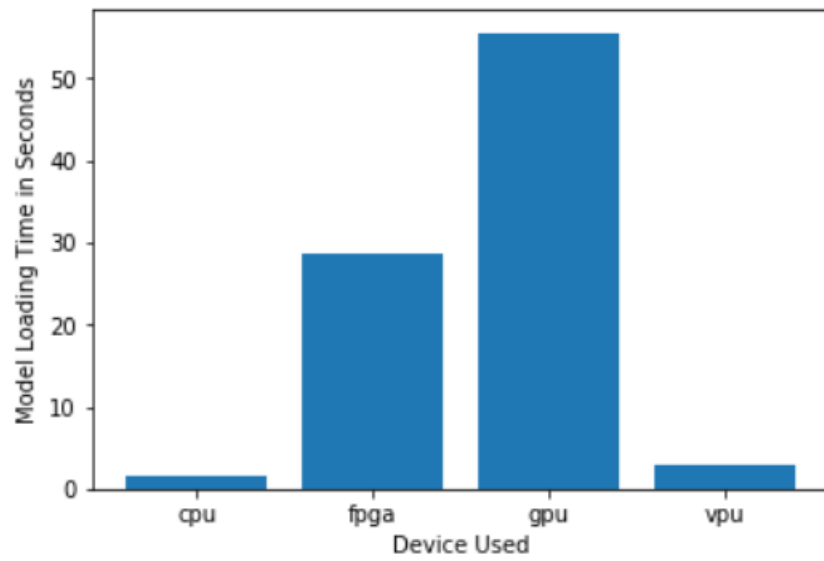
## Test Results

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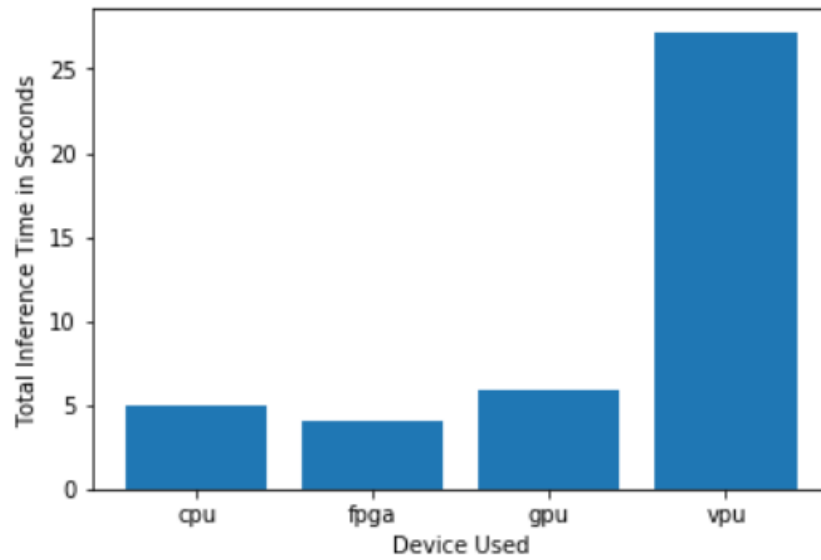
Checking on the metrics we see that the less inference time is for FPGA. The time to generate an output for a single image. FPGA is the best hardware to manage more Frames in this case we have around 40 frames per second.

We can also see that CPU takes less seconds and for loading the model. Even the best hardware is the FPGA but the customer would like to save as much as possible so we take advantage for the hardware the customer has and besides CPU has not bad Performance.

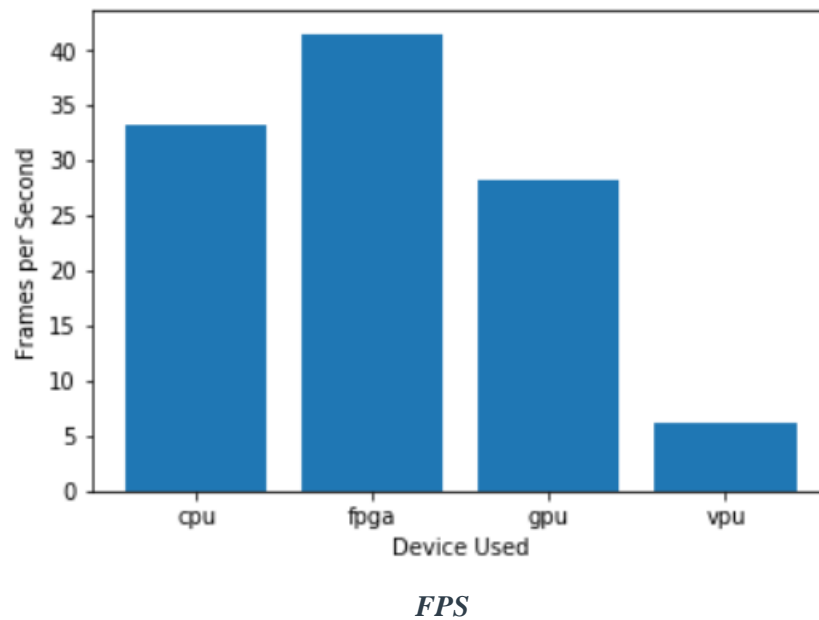




*Model Load Time*



*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

*Regarding the scenario, the client already has the enough necessary hardware Intel i7 in the store's checkout. We can use that to reduce extra cost.*

## 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)

*Based on the information about the customer we don't have no more than 300Usds to invest so we don't have chance to get FPGA because it takes more than 1700 Usds. We can reuse the hardware CPUs and get some NCS2 to improve the power requirements.*



## Transportation FPGA

No. of People in Queue 1 is 4 Queue full; Please move to next Queue

No. of People in Queue 2 is 2

Person: 10.3%

No. of Total People: 9



Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
<i>Example requirement:</i> The client requires a tiny device to be connected to their CPU—and their budget is only about \$100 for each device.	<i>Example explanation:</i> VPU or NCS2 is only about 27.40 mm in size and would fit in the price range.
Customer would like to save as much as possible both on hardware and future power requirements	<i>NCS2 could be the best choice for improvement</i>
Customer budget allows for a maximum of \$300 per machine	<i>Depending of the CPU we can invest in best CPUs but we would need to check if the Mother board could support a better CPU so if we don't have that option we can go for NCS2</i>
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>As we said we can go for better CPU or invest in NCS2. We also could bought more than one so we can do it to work in parallel.</i>

## Queue Monitoring Requirements

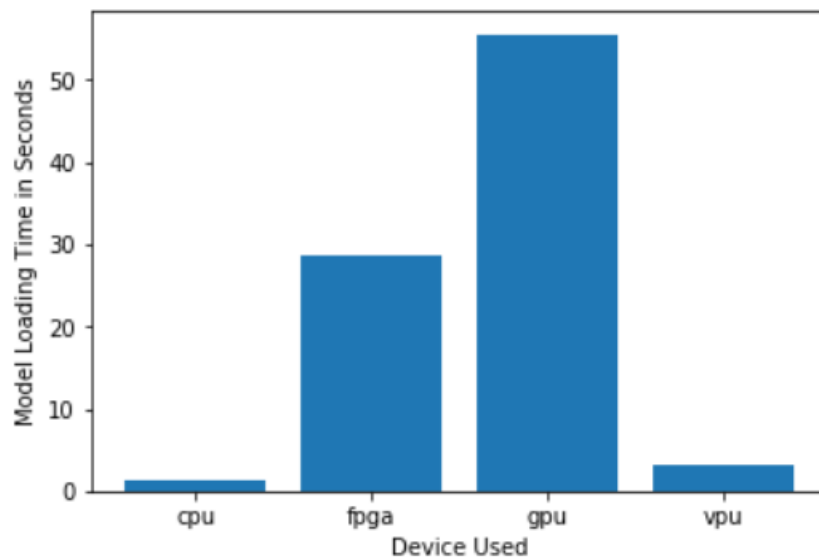
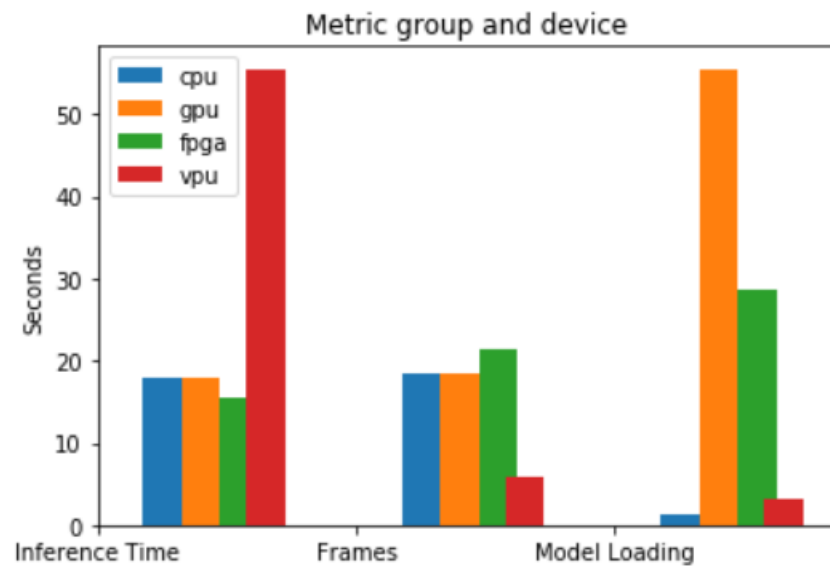
Maximum number of people in the queue	4
Model precision chosen (FP32, FP16, or Int8)	FP32

## Test Results

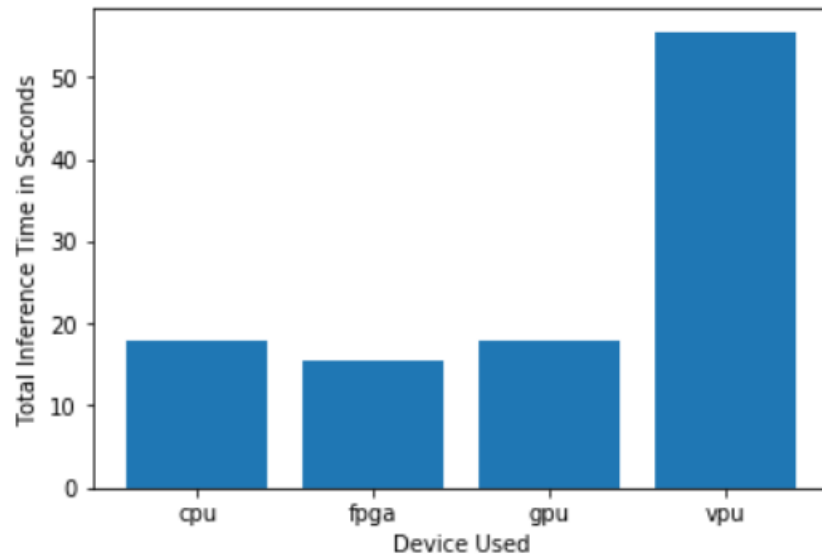
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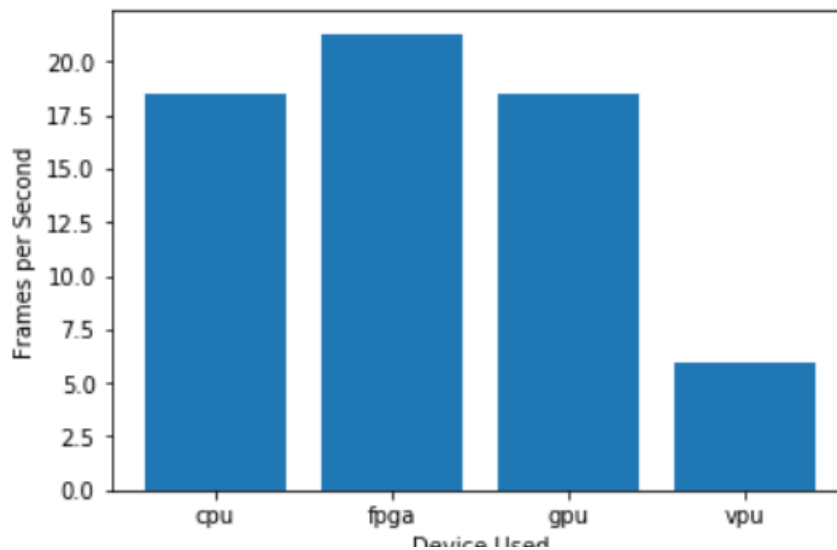
We can also see that CPU takes less seconds and for loading the model. Even the best hardware is the FPGA but the customer just has 300 Usds so we take advantage for the hardware the customer has and besides CPU or getting new NCS2.



*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

Even the best hardware is the FPGA but the customer just has 300 Usds so we take advantage for the hardware the customer has and besides CPU or getting new NCS2.

