

# 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

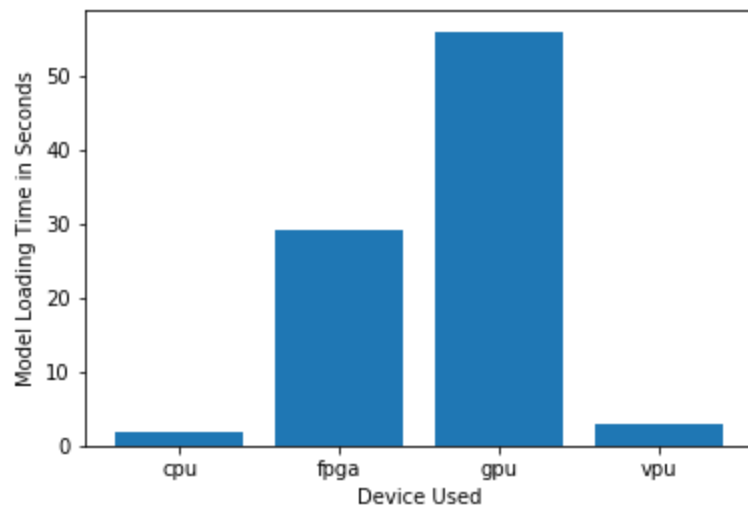
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
Client requirement is to do image processing 5 times per second on a video feed of 30-35 FPS	FPGA provides low latency as compared to other devices
It can be easily reprogrammed and optimized for other tasks like finding flaws in the semiconductor chips	FPGAs are ideal for this scenario because they are very flexible in the sense that they are field programmable
It should at least last for 5-10 years	FPGAs that use devices from Intel's IoT group have a guaranteed availability of 10 years, from start to production
Budget is not a constraint since the revenue is good	FPGAs are at least \$1000

#### Queue Monitoring Requirements

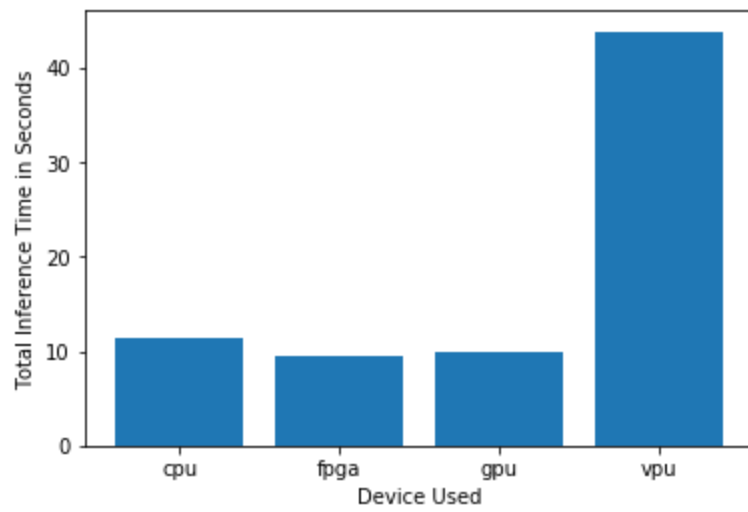
Maximum number of people in the queue	5
Model precision chosen (FP32, FP16, or Int8)	FP16

#### Test Results

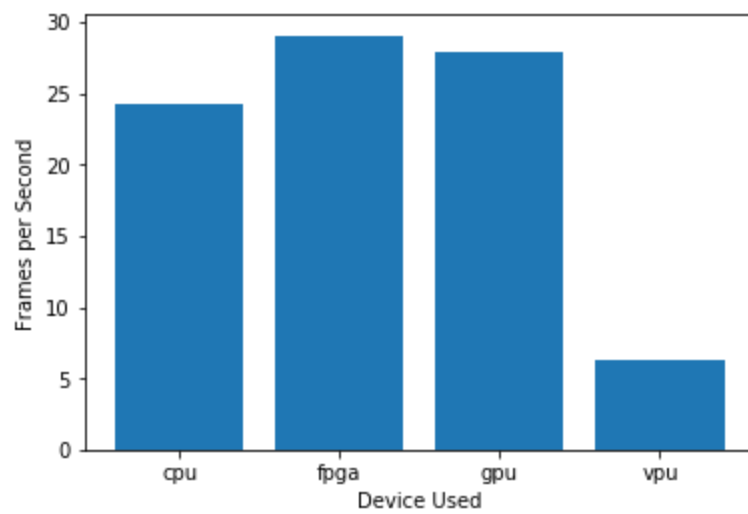
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



***Model Load Time***



***Inference Time***



***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 per the requirements listed above, FPGA indeed proves out to be the best hardware for this scenario since it offers the highest frame rate and lowest inference time.*

## 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)

*Integrated GPU that comes with core i7*

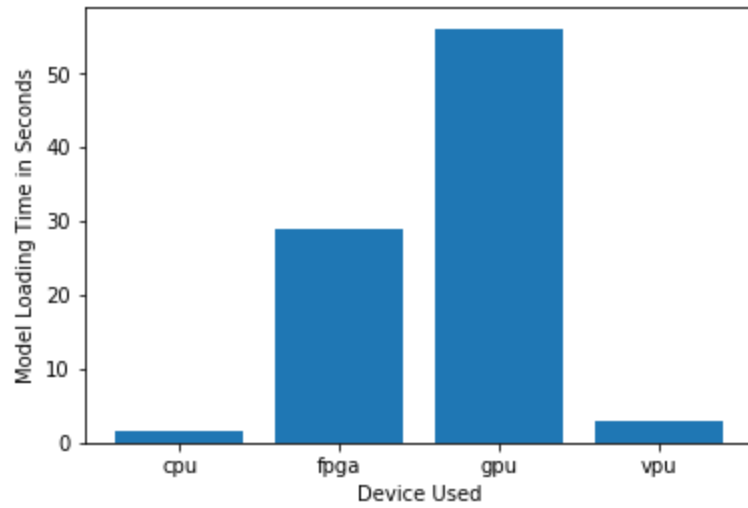
Requirement Observed (Include at least two.)	How does the chosen hardware meet this requirement?
<i>Limited Budget</i>	<i>No need to buy anything, use the IGPU in the systems in the checkout counters</i>
<i>Latency should not be an issue since even on weekdays the average wait time is around 230 seconds</i>	<i>IGPU offers comparatively higher latency as compared to devices like VPUs</i>
<i>Client also wants to save as much as possible on electric bill</i>	<i>IGPUs are pretty customizable as they have configurable power consumption option</i>

### Queue Monitoring Requirements

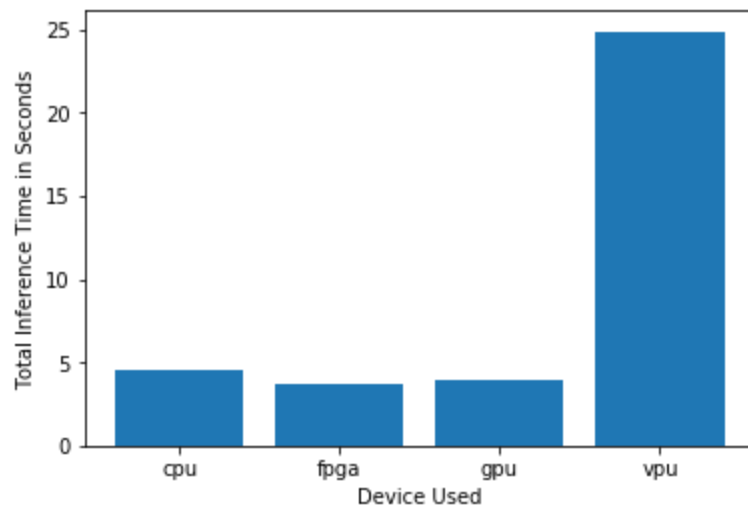
Maximum number of people in the queue	<i>5 (during rush hours)</i>
Model precision chosen (FP32, FP16, or Int8)	<i>IGPU EUs are only optimized for FP16</i>

### Test Results

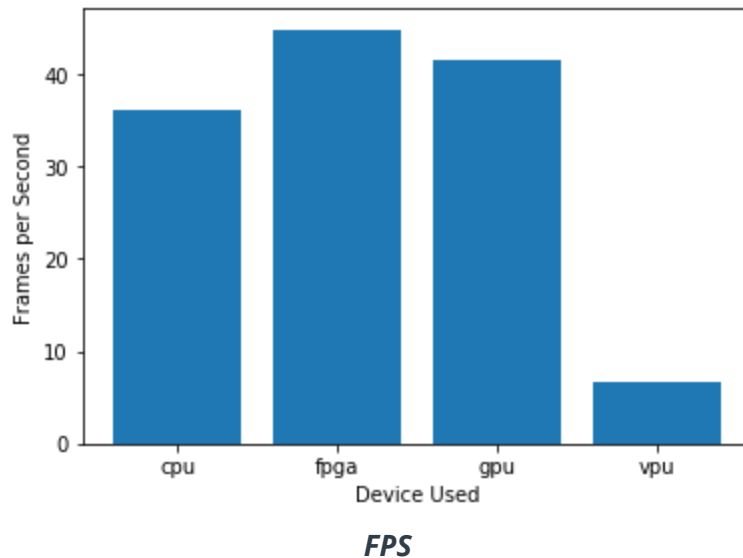
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



***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 main requirements of the client were a limited budget and saving as much on electric bills as possible. The client already has modern systems equipped with core-i7. Although the model loading time for an integrated GPU is the highest but still it is the perfect hardware for this current scenario as it offers low latency and high frames per second with no additional 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)

VPU

Requirement Observed  
(Include at least two.)

How does the chosen hardware meet this requirement?

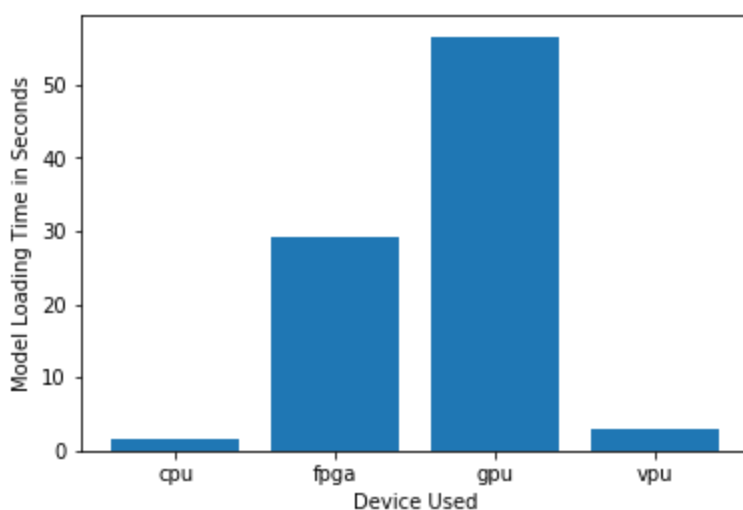
<i>Client has a maximum budget of \$300 per system and she would like to save as much as possible</i>	<i>VPUs are small, low-cost devices which can accelerate the performance of pre-existing CPUs</i>
<i>Save as much as on power requirements</i>	<i>VPUs are very low power devices</i>

## Queue Monitoring Requirements

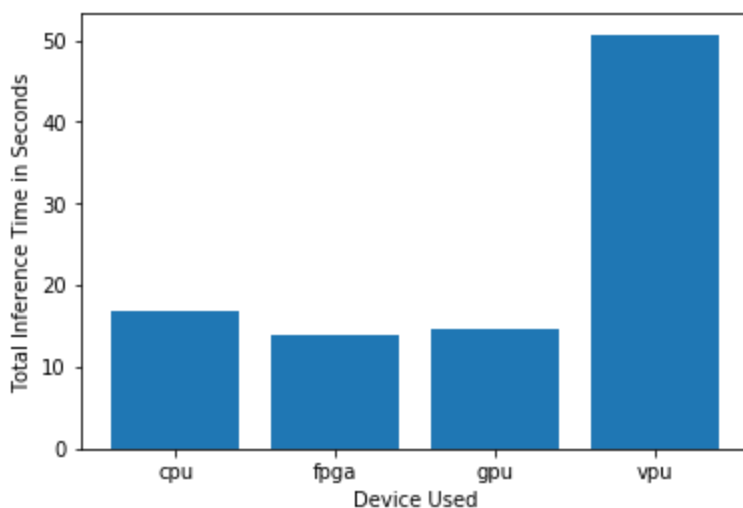
<b>Maximum number of people in the queue</b>	<i>15 during peak hours</i>
<b>Model precision chosen (FP32, FP16, or Int8)</b>	<i>FP16</i>

## Test Results

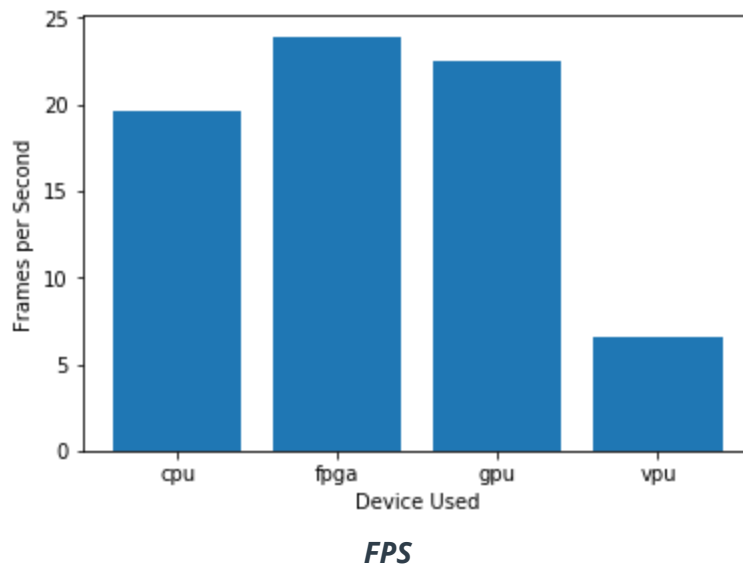
After you've tested your application on all four hardware types (CPU, IGPU, VPU, and FPGA), copy the matplotlib output showing the comparison into the spaces below. You should have three graphs (for model load time, inference time, and FPS).



**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

*Although VPUs have the slowest inference time, the qualities that make them very attractive are low-budget, low-power and very fast model loading time. These are the things that matter a lot to the client so our hardware recommendations are Intel Neural Compute Stick-2.*