Choose the Right Hardware

Proposal Template

# Scenario 1: Manufacturing

## Which hardware?

|  |
| --- |
| **Which hardware is most appropriate for this scenario?**  **(CPU + Intel GPU / CPU + FPGA / CPU + VPU)** |
| *CPU + FPGA* |

Requirements

Now that you've picked the hardware, it's time to explain *why* this hardware is the right choice. Look through the scenario and find any relevant requirements. Be sure that you at least include the following:

1. Power Requirements
2. Space Requirements
3. Economic Constraints

Describe each requirement below, along with an explanation of how the selected hardware meets that requirement.

|  |  |
| --- | --- |
| **Requirement observed** | **How does the chosen hardware meet this requirement?** |
| *Example requirement:*  The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device. | *Example explanation:*  VPU or NCS2 is only about 27.40 mm in size and would fit in the price range. |
| *Power Constraints - The client is moving towards an energy efficient workplace.* | *FPGA can be more power-hungry, the Intel Arria 10 consumers just 30 W.* |
| *Space Constraints - The client has space constraints, so he can only accommodate small devices, which can be added to computers already present* | *An FPGA card would fit in a PCIe slot within the current chassis of the computers already present.* |
| *Economic Constraints - There are no stated constraints related to costs.* | *FPGA costs are lesser than an ASIC in the long run.* |
| *Flexibility - The client wants a device that has future flexibility so that they will be able to create their own code and run it for a specific use-case.* | *An FPGA is designed to be configured by the customer.* |

## Write-up

Now synthesize your points from above and provide a brief write-up (not more than about 50 words) describing why the chosen hardware is the best choice for this scenario.

|  |
| --- |
| **Write-up: Why is this the right hardware?** |
| *A CPU + GPU option is not suitable, as these are currently being used for product inspection. Therefore, some kind of accelerator card would make sense. A removable NCS2 device would not be the best option, as it is to be installed on the factor floor, which is an open environment. Such a device could be easily removed or taken. Since the client desires future flexibility, this leaves an FPGA card which would fit in a PCIe slot within the chassis of the existing computers.* |

## Queue Monitoring Requirements

|  |  |
| --- | --- |
| **Number of people required per queue:** | *2 in Packaging* |
| **Time for the process in the queue (ms/s):** | *200ms/s (5 processes/second)* |
| **Model precision chosen (FP32, FP16, or Int8)** | *FP16* |

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# Scenario 2: Retail

## Which hardware?

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| --- |
| **Which hardware is most appropriate for this scenario?**  **(CPU+In GPU / CPU+ FPGA / CPU+VPU)** |
| *CPU + Integrated GPU* |

Requirements

Now that you've picked the hardware, it's time to explain *why* this hardware is the right choice. Look through the scenario and find any relevant requirements. Be sure that you at least include the following:

1. Power Requirements
2. Space Requirements
3. Economic Constraints

Describe each requirement below, along with an explanation of how the selected hardware meets that requirement.

|  |  |
| --- | --- |
| **Requirement observed** | **How does the chosen hardware meet this requirement?** |
| *Example requirement:*  The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device. | *Example explanation:*  VPU or NCS2 is only about 27.40 mm in size and would fit in the price range. |
| *Power Constraints - Client wants to invest in greener energy consumption.* | *Using existing CPU + Integrated GPU so there are no additional power requirements.* |
| *Space Constraints - Client does not have any store floor space available.* | *Using existing CPU + Integrated GPU does not require additional space.* |
| *Economic Constraints - Client can’t afford new appliances or devices.* | *Using existing CPU + Integrated GPU, so no additional devices need to be purchased.* |

## Write-up

Now synthesize your points from above and provide a brief write-up (not more than about 50 words) describing why the chosen hardware is the best choice for this scenario.

|  |
| --- |
| **Write-up: Why is this the right hardware?** |
| *The client cannot afford any new appliances or devices at the moment, and does not have any store floor space available. However, he has personal computers installed with CPU + Integrated GPU already, so using the existing hardware is the best choice.* |

## Queue Monitoring Requirements

|  |  |
| --- | --- |
| **Number of people required per queue:** | *2* |
| **Time for the process in the queue (ms/s):** | *1000ms/s (>1 process every 230s)* |
| **Model precision chosen (FP32, FP16, or Int8)** | *FP16* |

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# Scenario 3: Transportation

## Which hardware?

|  |
| --- |
| **Which hardware is most appropriate for this scenario?**  **(CPU+In GPU / CPU+ FPGA / CPU+VPU)** |
| *CPU + VPU* |

Requirements

Now that you've picked the hardware, it's time to explain *why* this hardware is the right choice. Look through the scenario and find any relevant requirements. Be sure that you at least include the following:

1. Power Requirements
2. Space Requirements
3. Economic Constraints

Describe each requirement below, along with an explanation of how the selected hardware meets that requirement.

|  |  |
| --- | --- |
| **Requirement observed** | **How does the chosen hardware meet this requirement?** |
| *Example requirement:*  The client requires a tiny device to be connected to their CPU—and their budget is only about $100 for each device. | *Example explanation:*  VPU or NCS2 is only about 27.40 mm in size and would fit in the price range. |
| *Power Constraints – Current systems consume about 80 watts.* | *While the TDP of a CPU ranges from 40-100 watts, a VPU can reduce this up to 8 times.* |
| *Space Constraints - Client has over three systems in a small space in the middle of the platform. She does not want an additional bulky device but would invest in smaller devices that can be added to the PCs.* | *A VPU or NCS2 is only about 27.40 mm in size.* |
| *Economic Constraints – Client’s budget is $100-$150 for each device.* | *A VPU costs around $100 for each device.* |

## Write-up

Now synthesize your points from above and provide a brief write-up (not more than about 50 words) describing why the chosen hardware is the best choice for this scenario.

|  |
| --- |
| **Write-up: Why is this the right hardware?** |
| *A CPU + GPU option is not suitable, since Ms. Leah’s current PC system is used for CCTV recording, so there may not be enough capacity in this machine to perform inference. Therefore, some kind of add-in accelerator card is recommended. An FPGA card would cost over $1,000, which exceeds Ms. Leah’s budget of $100 to $150. Therefore, one or two NCS2 sticks would be the best option.* |

## Queue Monitoring Requirements

|  |  |
| --- | --- |
| **Number of people required per queue:** | *7 (assuming target is average queue in off peak hours)* |
| **Time for the process in the queue (ms/s):** | *1000ms/s (real time monitoring)* |
| **Model precision chosen (FP32, FP16, or Int8)** | *FP16* |