**Exercise 4. Perform Capacity Planning**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. **Throughput Calculation and Projection**

**First**, identify which machine would directly serve the data entry done by the nurses and doctors.

* How many nurses and doctors does that machine have to
* serve
* ?
* How many data entries would they do in a day? (entering weight, height, observations, etc)
* How much throughput in term of data entries per minute does the machine have to handle? Please note the number of hours per day and make assumption on how long would they work. Consider also peak vs off-peak behavior.

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| --- | --- | --- |
|  | **Daily throughput** | **Per second/minute throughput** |
| **Screening Data Entry** |  |  |
| **Calculation** |

Secondly, consider whether the assumption that you have made in the calculation would change in the subsequent 3 years, and circle your choice below (option a or b)

1. If you think that it is quite likely that the assumption will not change, then the estimation throughput that you’ve calculated can still be used for the subsequent 3 years.
2. If you think that it is more likely that the assumption changes, calculate the new throughput 3 years later and write it down at the space below

|  |  |
| --- | --- |
|  | **Per second/minute throughput** |
| **Student data entry throughput after 3 years** |  |
| **Calculation:** | |

1. **Throughput Calculation and Projection**

It is reasonable to assume that SHB need to update its student record data from the latest master student records in mainframe. In this particular case, the case study cites the limitation in mainframe that the mainframe can only prepare a file which contains all of the student records (more than 10 million – refer to the table in the case study for actual figure).

One of the common design for the student download would follow the design below:

Student Record Update

FTP Server

Mainframe

SHB DB

Our task is to calculate the throughput required for “Student Record Update” batch job. In order to do this, you need to get the number of records (assume 1 student would have 1 student record) and the batch window available to run our batch job.

For this exercise, you can make your own assumption on the batch window that you think is reasonable. In real projects, we would need to orchestrate batch window for various batch job.

Once you have the number of records and the batch window, it should be quite trivial to calculate the expected throughput of the batch job in term of how many record it need to process every minute.

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| --- | --- |
|  | **Student record/minute throughput** |
| **Mainframe Record Processing** |  |
| **Calculation** | |

Again, consider whether the assumption that you have made in the calculation would change in the subsequent 3 years, and circle your choice below (option a or b)

1. If you think that it is quite likely that the assumption will not change, then the estimation throughput that you’ve calculated can still be used for the subsequent 3 years.
2. If you think that it is more likely that the assumption changes, calculate the new throughput 3 years later.

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1. **Disk Requirement for the next 5 years**

* Calculate a ballpark figure (upper limit) on how much space a student screening information entered by the nurses and doctors would need based on the E-R diagram in the case study.
* Calculate the disk requirement to store the **screening data and its growth** over 5 years

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| --- | --- | --- | --- | --- | --- |
|  | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
| **Disk Requirement** |  |  |  |  |  |

**Calculation**

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1. **Hardware/Software Requirement**

Calculate the number of hardware and software required for the project. Use the throughput from section 1 and 2 to guide your estimates on the server size and refer to your physical design to put down the hardware/software requirement.

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| --- | --- | --- |
| **Hardware/Software** | **Quantity** | **Note/Justification** |
|  |  |  |

1. **Procurement Plan**

Create a procurement lead time matrix for SHB. Put your assumption for the project. You can use the typical procurement lead time needed for the organization you worked for.

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| **Procurement Plan for** |  |  |
|  |  |  |
| **Process** | **Source** |  |
| Internal procurement process (raise request to PO) | Internal organization |  |
| Lead time from PO to delivery | Hardware vendor |  |
| Hardware installation time | Hardware vendor |  |
| Software installation time | Software vendor/in house IT |  |
| Production setup time | In house IT |  |
| Testing | In house IT/user |  |
|  |  |  |
|  |  |  |
| **Planning buffer** | |  |
| **TOTAL** | |  |
|  |  |  |
| Estimated downtime/reduced SLA | |  |
| Lead time for downtime approval | |  |

1. **Metrics**

Identify 3 application metrics and 3 system metrics to be monitored that you think will be helpful in providing input for future capacity planning.

Propose tools to monitor them (e.g. : HP OpenView, IBM Tivoli, Windows Performance Monitor, Unix shell tools, Application self-logging, etc)

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| **Application Metrics** |
| **1.** |
| **2.** |
| **3.** |

|  |  |
| --- | --- |
| **System Metrics** | **Tools** |
| **1.** |  |
| **2.** |  |
| **3.** |  |