**Cost Benefit Analysis & Calculation of Return on Investment(ROI)**

**Q1:** The **Total Cost of Physical and Virtual** Layer Setup (H/w purchases) in **Majan IT Infra** is given below

|  |  |  |
| --- | --- | --- |
| **No.** | **Description** | **Price($)** |
| **Computing Hardware** | | |
| 1. | CPU | $1440.00 |
| 2. | Motherboard (C-422 chipset) | $350 |
| 3. | RAM | $1340 |
| 4. | Cooling | $150 |
| 5. | Power Supply | $140 |
| 6. | Hard Drive | $70 |
| 7. | Video Card | $600 |
|  | **Sub Total** | **$4090** |
| **Storage Hardware** | | |
| 1. | Disk Drives | $460 X 18 = $8280 |
| 2. | Enclosure | $2500 |
|  | **Sub Total** | **$10780** |
| **Networking Hardware** | | |
| 1. | Router | $285 |
| 2. | Switch | $3295 |
|  | **Sub Total** | $3580 |
| **Total Cost** | | **$18450** |

The Majan IT Infra company wants to merge their available H/w and other infrastructure with a Cloud provider The **Total Cost of Using Cloud Services** for the above configuration is given below🡪

|  |  |  |
| --- | --- | --- |
| **Type** | **Standard**  **Deploy in cloud provider accounts owned by Red Hat** | **Bring your own cloud**  **Leverage your existing cloud provider discounts and settings** |
| ~~Single availability-zone cluster~~ | ~~Starts at $36,000/yr~~ | ~~Starts at $16,000/yr~~ |
| Multiple availability-zone cluster | Starts at $81,000/yr | Starts a**t $36,000/yr** |

The service that is recommended is the multiple availability zone cluster which cost $36,000 per year. It provides a cluster administrator console which allow to view and control the cluster. It allows to track down the issues.

|  |  |  |
| --- | --- | --- |
| **Item/Function** | **Description** | **Cost** |
| RSA Authentication Manager  (Multifactor Authentication) | Authentication Manager Base Edition, 30 – 100 Users | $75.65 per month ($907 per year) |
| Encryption | The price of full disk encryption | $232 per user, per year |
| Backup | 1000GB (1TB) | $350, per year |
| **Total** |  | **$1489** |

**Total Cost of security solutions**

Using the data given in the above tables, calculate the Return Of Investment(ROI) for Year I, II and III.

|  |  |  |  |
| --- | --- | --- | --- |
| **YEAR** | **1** | **2** | **3** |
| COSTS | $55939 | $37489 | $37489 |
| ESTIMATED Gain | $30000 | $70000 | $90000 |
| ROI [(Gain – Cost) / Cost]\*100 % | -46.37% | 86.72 % | 113.40% |
|  |  |  |  |

**Exercise 1:** The data of a data science research project is transmitted through a high speed network (fiber-optic cables) and provide a bandwidth of 56 Gbps.

1. How long does it take to transfer the 35 PB (1 PetaBytes = 2 50 Byte) through a 56 Gbps network?
2. What will be the best choice of network service (Cloud or Own Network Infrastructure) and why?

**Solution:**

56 Gbps bandwidth = 56 \* 2 30 b / s

= 7 x 2 30 Bytes / s (since, 1 Byte = 8 bits)

Duration of transmission = 35 x 2 50 Bytes / 7 x 2 30 Byte/s = 5 x 2 50 – 30  = 5 x 2 20  sec

= 5 \* 1024 \* 1024

= 5,242,880 s

= 87,381 m

= 1456 h

= 24.1 d

= Approx 24 days

**It will take approximately 24 days**

**1 K Byte = 1024 = 210  Byte**

**1 MByte = 210  K byte = 210  \* 210 Byte = 2 20 Byte**

**1 GB = 210  Mbyte = 210  \* 210 K Byte = 210  \* 210 \* 210 Byte = 2 30 Byte**

**1 TB = 240  Byte**

**1 PB = 250  Byte**

**1 ZB = 260  Byte**