<https://github.com/sthirumalai2020/Cloud-Computing.git>

How specifically does moving to a cloud computing model affect IT budgets?  Be sure to provide examples of how this trend can impact an organization’s budgets.

* + A growing organization need to focus on the high availability and scalability of applications which will help them to retain its customer base and to provide seamless quality in the applications if more customers are added.
  + This involves more focus on computing power and resources hence more cost involved to achieve that.
  + The Income should not over run the infrastructure costs and should not end up in a loss for the organization.
  + The organization need to plan cautiously on setting up datacenters “On-Premise” or “On-Cloud” which could save money and, in the meanwhile provide seamless quality and availability of applications.
  + The IT budgeting for On-Premise model involves acquiring Servers, Storages, Network equipment, Office furniture, Computers, Software, Licensing and patent costs, Real estate to host the datacenter, Cooling systems, Power supply, Power backup, Security, Human efforts, cost and time involved to create an operational datacenter. This is a one-time investment and this is termed as “Capital Expense” or “CAPEX”.
  + The operational expenses (“OPEX”) include rent for the real estate, power bills, Payroll for datacenter engineers, Network and Internet expenses, upgrading hardware/Software expenses, Research and Development costs, Maintenance costs which incur regularly.
  + The Return on Investment (ROI) on this expense will not be always guaranteed since the number of customers using the resources may vary drastically and the resources may be over or underutilized. This may lead to a profit/loss or break even.
  + So, the solution is to move the Infrastructure to Cloud since an organization can save the CAPEX involved in setting up the “On-Premise” datacenters and the operational costs will be minimal as the cloud hosting uses the “Pay per use” utility model.
  + For Instance, a datacenter with following IT resources can save up to 48% of the costs in CAPEX and OPEX when moved to cloud.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Server Detail** |  |  |  |  |  |  |
|  | **# of VMs** | **vCPU** | **RAM (GB)** | **OS** | **Avg. Utilization** | **Optimize by** |
| **Non-DB** | **100** | **4** | **16** | **Linux** | **100%** | **RAM** |
| **DB** | **10** | **16** | **64** | **Linux** | **100%** | **RAM** |
|  |  |  |  |  |  |  |
| **Storage in TB** |  |  |  |  |  |  |
| **SAN** | **NAS** | **Object** |  |  |  |  |
| **100** | **100** | **1,000** |  |  |  |  |

* + This is a guaranteed ROI and the advantage here is the OPEX will be reduced as pay for the usage model is in place. The application also be scaled automatically and the quality will not be compromised.
  + The “Total Cost of Ownership” calculators (TCO Calculators) can be a useful tool which may give a forecast on the savings when moved to Cloud and a comparison between “On-Premise” and Cloud Models.
* Did you find any of the cost calculators particularly helpful?  Why or why not?  Were the results surprising in any way?  Why or why not?  What other cloud cost calculators have you used or are aware of?
  + There are various TCO calculators available over the internet from different cloud providers.
    - Here are few examples.
      * <https://awstcocalculator.com/>
      * <https://cloud.google.com/products/calculator/>
      * <https://azure.microsoft.com/en-us/pricing/tco/calculator/>
      * <https://tco.vmware.com/tcocalculator/>
      * <https://www.rackspace.com/en-us/tco>
  + The AWS and AZURE TCO calculators were used to compare the On-premise and cloud models for the below requirement. The result of the AWS forecast shows the consumer can save a whopping 48% over 3 years which is around 1 Million USD.
  + The AZURE TCO is way different and it allows only Microsoft product for comparison. For example, the database servers had options for SQL servers and DB products for MS and not on other Databases.
  + The Azure portal provided various other costs such as
    - Compute costs which include Hardware cost, Software cost, Electricity cost, Virtualization cost and Database cost.
    - Data center costs which includes Compute costs and Storage costs.
    - Networking costs, Storage costs and IT Labor costs.
  + I were designing a TCO calculator, I would provide an interface to upload the statistics of the resource usage and peak utilization as excel or in other format so that the costs can be predicted accurately.
* If your organization were to shift entirely to a cloud computing model, how would this impact your IT budget?  Would it be more beneficial to shift only a portion to a cloud computing model?  How would you propose making the determination as to what shifts to cloud, and what remains on-premise?
  + Moving the entire IT infrastructure to cloud will be good for an organization with respect to cost savings, however, there are few things which need to be considered before a decision is made.
    - The confidential and the data which impacts the business drastically must be secured and a careful investigation need to be done before shifting the data to cloud.
    - The cloud “Pay per use” plan may be revised by the provider and this may impact the ROI of an organization.
    - So, the organization need to have a model and best practices to reduce the cloud usage efficiently without compromising the quality.
  + It would be better to have the data which needs confidentiality and high business impact to be present in the “On-Premise” and the rest can be shifted to Cloud to save on IT budgeting.
* Do you have any other thoughts about the economic implications of moving to the cloud?
  + Moving to cloud may be better fit for an organization financially, however the organization need to have an action plan in place to mitigate the data security.
  + The organization have to carefully inspect the savings on a longer term instead of looking for a short-term benefit by moving to a cloud.