On-premise infrastructure as a service

The unmet need of enterprise IT

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Foreword

The deep penetration of digital technology is evident from the number of smartphone users and reach of wireless Internet. Through digital technology, organisations have found new ways of engaging their customers and driving their revenues. This has resulted in organisations investing heavily in digital technology in order to realise their business goals. Moreover, the role of traditional IT teams has changed—from supporters to drivers of business goals. In this scenario, IT infrastructure, the base layer of enterprise IT architecture, has become a pain point in the minds of the C-suite. Traditional methods of procuring IT infrastructure involve lengthy procurement cycles and high amounts of upfront payments. From an investment perspective, this practice of capex procurement raises several red flags to the CFO as it involves a dramatic loss of cash reserves and requires the organisation to take on the financial risks associated with actually owning the asset. From an IT operations perspective, the lengthy procurement period signals a loss in agility for the organisation in delivering revenue-generating applications to the market.

Service-oriented models are a new mode for using IT infrastructure. In such models, the organisation consumes IT infrastructure as a service. As opposed to upfront payments, service-oriented models involve monthly payments wherein an organisation is billed only for the infrastructure actually used by it. All financial risks of owning the infrastructure rest with the service provider and not the organisation. Likewise, the burden of increasing capacity and upgrading the same also rests with the service provider. However, along with the obvious benefits, traditional service-oriented models also carry certain risks, owing to which organisations are hesitant to completely adopt service-oriented models. These risks include data security and regulatory compliance issues (especially in the case of highly regulated industries such as the banking sector). Hence, infrastructure as a service (IaaS) is not a silver bullet to the question of enterprise IT infrastructure.

In this paper, we have sought to examine a new trend in the industry where organisations are looking for service-oriented solutions that combine the economics of the cloud with the security, control and visibility offered by on-premise IT solutions. We have enumerated the features of the ideal solution that the industry expects from infrastructure service providers. Further, the accounting benefits of such a model and the expected tax treatment are discussed.

I hope that you found this paper interesting and look forward to hearing your comments and suggestions.

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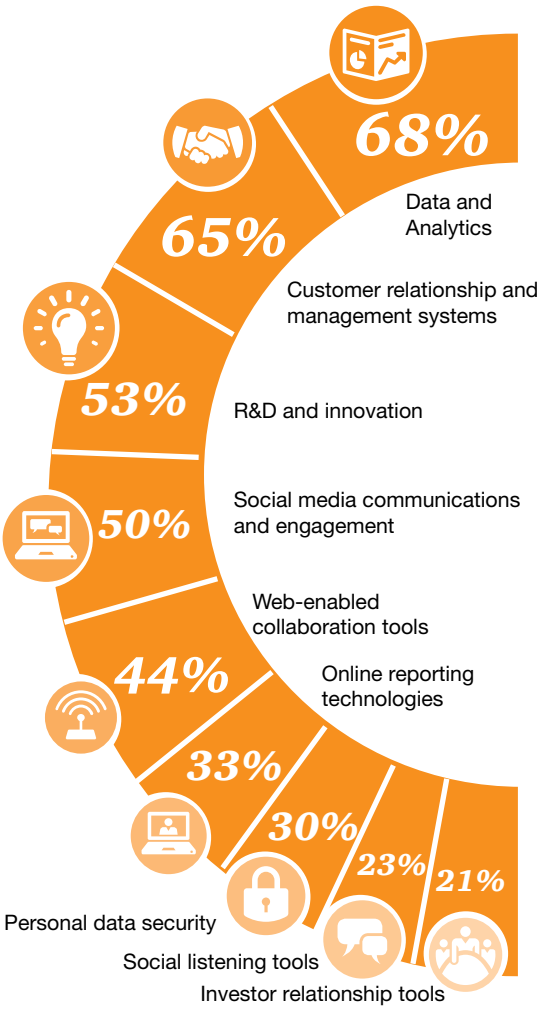
Changing CXO expectations

Introduction

The last decade has seen a large number of organisations use IT as a key enabler for process automation and business growth. Through IT, they were able to digitise their inherent processes, leading to more transparent and streamlined enterprises. There were two key drivers behind this large-scale internal digitisation. The primary objective was reduction of costs and increase in process efficiencies. The secondary objective was business growth and better customer management. Given the manner in which IT was positioned in organisations, digitisation often did not solve all the issues. The digitisation exercise was confined to individual business teams of an organisation, leading to the creation of information silos. This meant that the increase in individual efficiencies of business unit processes did not translate into larger gains for the organisation.

However, the last five years witnessed a change in the role of IT—from being a supporter of business processes to a driver of business growth. As markets got competitive and disruptive, it became important for companies to leverage IT to fuel their growth by targeting their customers through digital technologies. Time to value became the determining factor for winning and surviving in the market. In line with this trend, markets witnessed a dramatic rise in the adoption of new age IT technologies such as social, mobile, analytics and cloud (SMAC), artificial intelligence (AI), Internet of things (IoT), big data and predictive analytics. Today, these technologies offer organisations a way to 'hyper-target' their customers, connect with them, understand their behaviour, provide a seamless omnichannel experience, and offer personalised products and services. This trend is evident from PwC's 19th Annual CEO Survey (2016),[1] with 90% of CEOs identifying customers as the biggest driver of organisational strategy.

In order to completely leverage the opportunities offered by such technologies, organisations today will need to undertake a large-scale, enterprise-wide transformation in the way they think and do business, as well as how they consume IT. This will require an organisation to adopt an integrated data approach with total elimination of information silos to enable and unlock the potential of data-driven business decision making.



1. PwC. (2016). 19th Annual Global CEO Survey. Retrieved from: https://www.pwc.com/gx/en/ceo-survey/2016/landing-page/pwc-19th-annual-global-ceo-survey.pdf (last accessed on 10 February 2017)

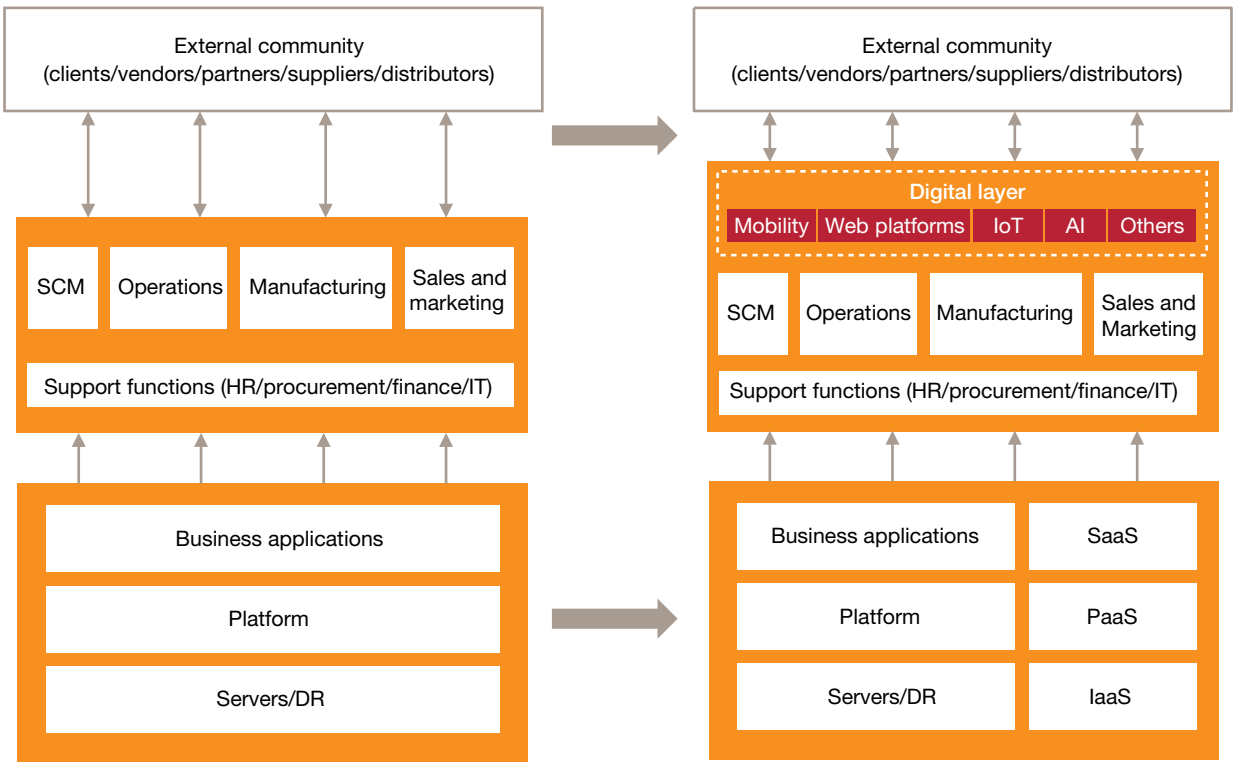
Enterprise IT structure	CIO/CTO concerns	CFO concerns	Other CXO concerns
Business applications Customer relationship management (CRM), enterprise resource planning (ERP), business intelligence, HR management, payroll applications, email marketing software **Platform** O/S and middleware, enterprise application integration, distributed computing environment, common object broker **Infrastructure** Storage, server and network, physical systems, virtualised systems	• Align IT with business needs • Reduce IT delivery times for bringing new initiatives to the market • Shorten the procurement and evaluation cycles • IT resource and license management • Rapid scale up of compute, storage and network requirements • Ensure reliable IT support and skilled manpower per latest technology • Manage technology obsolescence risk • Minimise latency in the use of business applications	• Return on investments • High capital expenditures • Unused licences • Loss of cash flow • Over-provisioning • Financial risk	• Availability of business and internal application • Efficient integration with multiple systems • Long TAT to implement initiatives • System uptime • Long TAT to implement initiatives

C-suite concerns about enterprise IT

For any organisation, from a chief technology officer (CTO) or a chief information officer (CIO) perspective, the key concerns stem from the time-intensive nature of traditional ways of IT procurement and the underutilisation of IT resources. For a CFO, the key concerns include IT spend, loss of cash flow resulting from upfront capital investments, the need for aligning cash flows with expenditures and high financial risks associated with the traditional avatar of enterprise IT. For chief experience officers (CXOs), the primary concern is the availability of systems to support current business needs and rapid implementation of new business initiatives via IT.

As the business expectations from these digital technologies rise, there is a corresponding increase in the expectations from traditional IT to integrate with the new age digital technologies, scale up rapidly and maintain a quality of service (QoS) that can support this new digital layer. Today, IT leaders face tremendous pressure on multiple fronts, including new evolving applications, security threats and compliance. At the same time, they are expected to improve business agility, reduce IT spend and increase return on investment (ROI) to business.

Factors impeding value realisation from digital



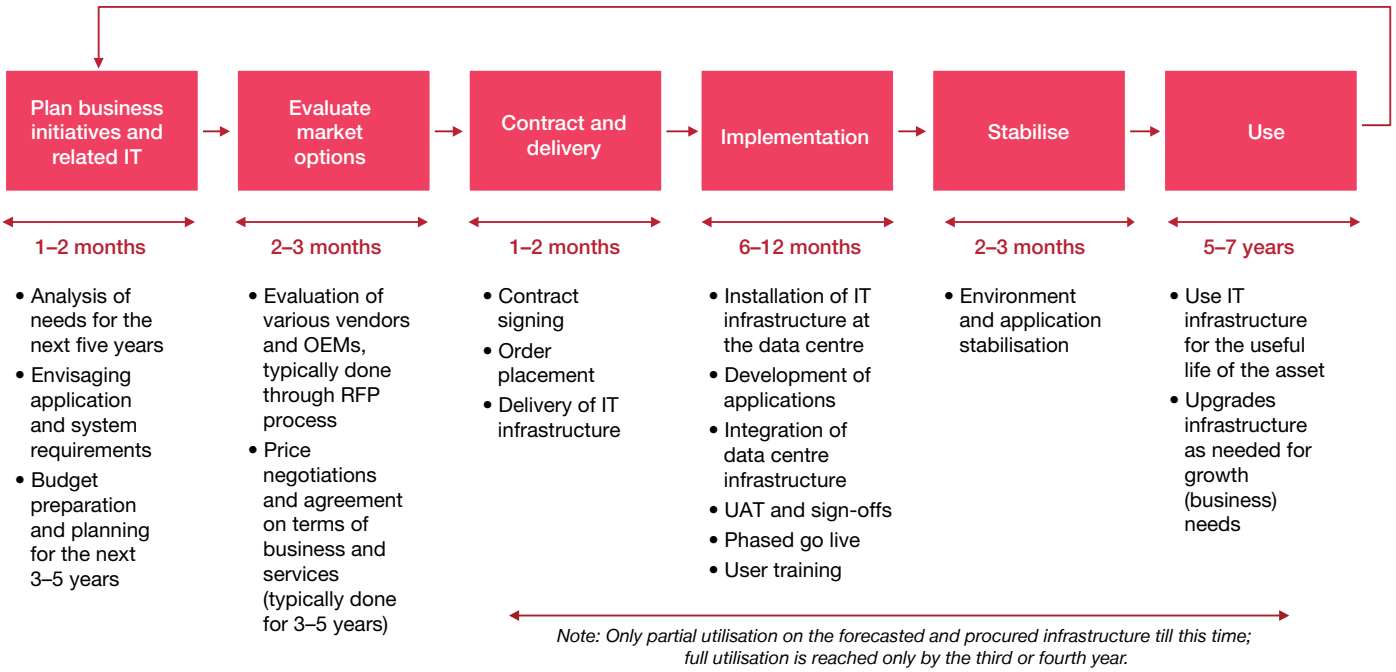
Evolution of enterprise IT

As organisations use the digital layer to become better integrated with customers, vendors, partners, distributors and suppliers, the need to respond to the market faster is increasing. In order to do so, organisations have been transforming themselves by moving out of activities that do not generate revenue. Moreover, IT has evolved from being a support function to a driver of strategy.

Even as the above market trends continue to evolve, currently, the digital layer is loosely integrated with enterprise IT as opposed to being an integral part of it. To realise the full value of digital technology, an organisation has to make IT a business partner, adopt leaner processes and improve the turnaround time (TAT) for various IT functions (procurement, implementation, refresh, etc.). There are two key challenges in the existing way of consuming IT that make it rigid and cost intensive and lengthen the cycles for change.

1. Longer TAT to implement infrastructure changes

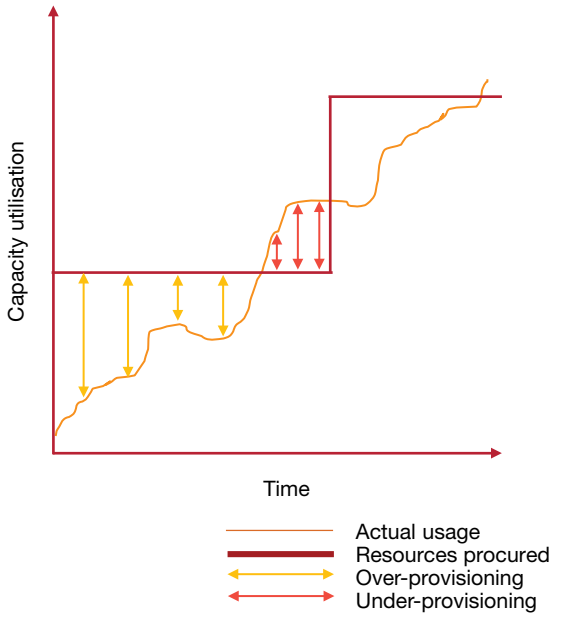
The planning of infrastructure is usually dependent on business initiatives. Once the plan for the initiative is ready, the IT department estimates the infrastructure requirement for a 3–5 year horizon because the process to deploy and upgrade is very tedious. Once the requirement is fixed, various options are evaluated, leading to contract and delivery. Implementation and stabilisation of the infrastructure take about 6–12 months on an average. This increases the TAT for any business initiative that involves infrastructure, since capacity augmentation usually takes a similar approach.



Traditional method of procuring IT infrastructure

2. Sporadic requirements leading to cycles of over-provisioning and under-provisioning

Organisations' requirements of IT resources grow sporadically. As requirements cannot be accurately predicted, organisations tend to over-procure IT resources through the outright purchase (apex) model after forecasting the requirements over long periods of time (typically a 4–6 year horizon). IT resources, as a result, are then over-provisioned, leading to IT assets remaining underutilised over long periods of time. When organisational IT requirements go beyond the procured capacity, organisations re-procure more IT resources through the same process route. These lengthy procurement cycles lead to periods where the old IT resources are overutilised. This becomes a repetitive process consisting of underutilised and overutilised IT resource cycles, which is adverse to business goals.

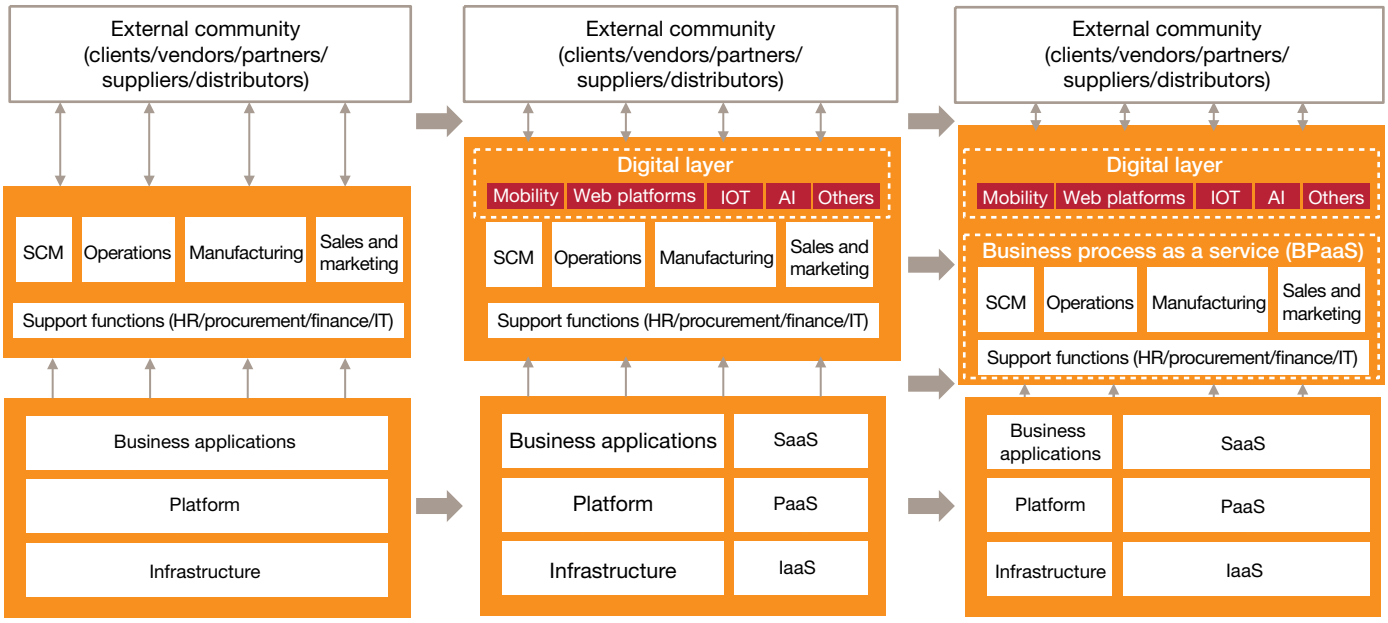


Growth in need for IT infrastructure in a typical organisation

The rise of service-oriented models

Futuristic IT represents a maturity level that will enable organisations to derive maximum benefits from the digital layer. It will require all business units to work together to create and deliver value to their customers. IT will need to tightly integrate with business drivers. At the enterprise IT level, it will also mean a complete integration of the digital interface (SMAC) with traditional/enterprise IT and a system that is completely workload-defined. In such a system, the different layers of enterprise IT communicate seamlessly with the external environment through the digital interface.

Thus, IT leaders need an agile and flexible IT solution to meet rapidly changing market and business needs.



Evolution of enterprise IT architecture

The mismatch between the growth requirements of business-critical applications and the inability of traditional captive IT to support such unplanned growth is leading to the adoption of service-oriented models.

Organisations are increasingly adopting every layer of enterprise IT as a service. Popular service-oriented models include PaaS, IaaS and SaaS.

In addition to quick TAT and rapid scaling, the other benefit of the 'as-a-service' model is that organisations can convert their upfront IT capital expenditures to periodically staggered operational expenses (pay-per-use model) and share financial risks with their service provider. The capital previously tied up for upfront IT procurements can now be used to support other business initiatives.

However, the movement towards service-oriented models needs to be a planned one as it frequently involves a step-by-step transition of different applications. Although there are concerns regarding the adoption of service-oriented models, they are still gaining popularity. The gradual adoption of service-oriented models requires a multi-dimensional evaluation. One of the challenges is balancing performance and cost.

POPULAR 'AS A SERVICE' MODELS

- **Software-as-a-service (SaaS):** It is a service where end users access software in the form of applications delivered over the Internet. Through a SaaS model, service users need not worry about hardware supporting their applications or about upgrading those applications. Key SaaS offerings include email clients, anti-virus software, CAD/CAE software and CRM tools.
- **Platform-as-a-service (PaaS):** The platform is the layer where developers interact with the software to develop end-user facing software. In PaaS, the service user is provided an operating system along with the necessary libraries and deployment environment required to build applications for their customers. Common PaaS offerings include the Google app engine for android applications and the GE Predix for developing applications for IoT.
- **Infrastructure-as-a-service (IaaS):** Also known as the cloud, IaaS offers storage, network and computing as a service. Through the IaaS model, organisations are able to reduce their capital expenditure and align cash flows, eliminate over-provisioning and ensure effective resource utilisation and retain no risk of owning the infrastructure.

Understanding and adopting IaaS

IT infrastructure such as servers, storage, network and related software are the major components of cost for IT project implementation. So by shifting to a consumption-based model for this infrastructure, one can address the key concerns of traditional outright purchase IT models, i.e. staggered pay-per-use billing, aligning cash flows, allowing faster TAT for IT-enabled business initiatives, right provisioning and rapid scale up of IT resources. Therefore, today, IaaS has become relevant to all organisations going through any kind of digital transformation, including legacy IT refresh, IoT initiatives, big data, new business applications, legacy workloads, mobility and social media initiatives. The above features also allow an organisation to focus on core business areas or applications rather than on mundane IT management tasks.

Key benefits of IaaS adoption:

- The entire infrastructure is owned and maintained by the service provider for the period of the contract.
- Billing is on a pay-per-use basis, thus eliminating huge capital investments, capital lock-in and financial risks.
- The IaaS service provider ensures availability and enterprise grade support.
- The organisation may be freed from other traditional outflows on annual maintenance contract (AMC) and warranties.
- The challenge of constant re-skilling for IT support is also done away with for an organisation.
- Reduced TAT for new business initiative implementation—organisations are usually able to reduce go-to-market times of applications due to the elimination of long procurement cycles for IT infrastructure.
- Allows for rapid on-demand scaling and is elastic. This makes provision for breakdowns and unprecedented spikes in usage.
- The service provider will pass on the benefit of latest technology advancements.
- Infra unit-based pricing is on a granular level and not on an entire infrastructure unit—i.e. billing is done on the actual infrastructure unit being used.
- Shadow IT may be eliminated.

While there are many benefits of using IaaS, there appears to be some reluctance towards adopting the public cloud IaaS model. According to a PwC study on the future of IT outsourcing and cloud computing,[2] some of the major risks perceived by the survey respondents in adopting a multi-tenant public cloud model include:

- Data security (62% of respondents)
- Existing data and systems integration (42%)
- Data and systems portability (41%)
- IT governance (39%) and service level agreements (35%)

Such concerns have slowed the adoption of the public cloud across industries, particularly in regulated industries. Further, unpredictability in billing is also a concern. These factors inhibit the outright and full-fledged adoption of the public cloud by an organisation.

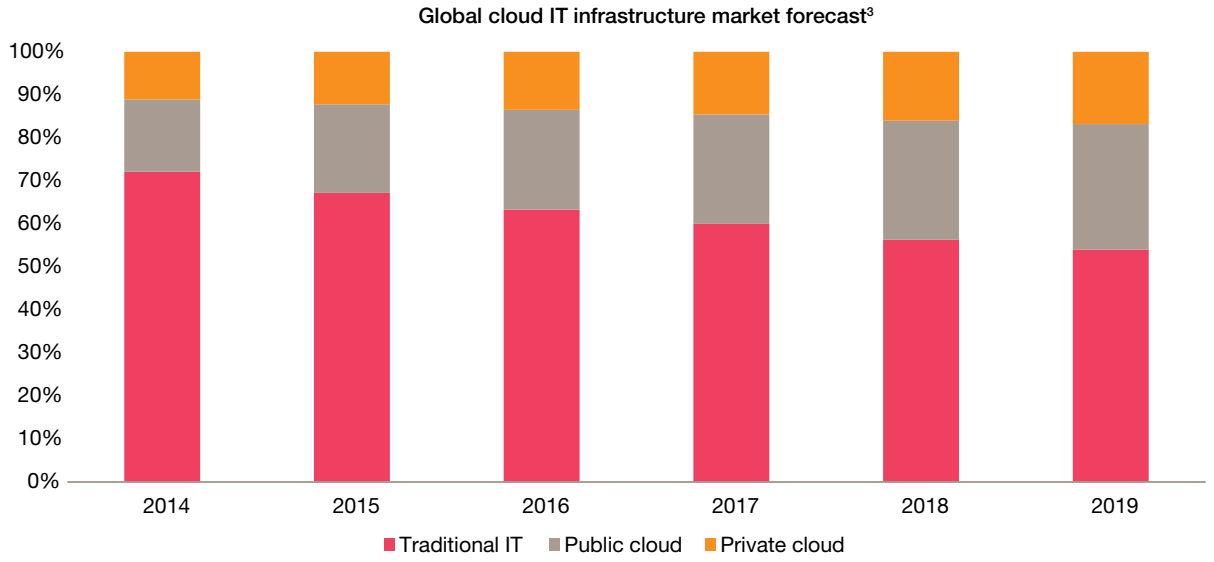
CLOUD SERVICE MODELS

Public cloud: A public cloud is a cloud computing model where the physical infrastructure is stored off premises in a remote location. Customers access these resources through a network. In a public cloud, a group of customers share a pooled group of resources, an architecture known as multi-tenancy. In case of temporary spikes in requirement, resources not utilised by other customers are utilised for the duration of the spike. The customer is only billed for the resources that they use. A public cloud offers the advantages of on-demand scaling (or self-service), elasticity and pay-per-use billing.

Private cloud: A private cloud is an IaaS model where the resources can be accessed by only one client. Customers have the privilege of the choice of technology and architecture. Private clouds have two flavours: The first is the on-premise private cloud and the other is the externally hosted private cloud. Both flavours ensure that the organisation has control over its data and that the data is isolated from that of others. An on-premise private cloud is hosted on the organisation's data centre. The organisation will have to bear the capital expenditures for the data centre's resources. In the case of an externally hosted private cloud, the physical resources allocated to one customer are logically isolated from those of another customer. Both flavours generally ensure a higher degree of control over data, ensuring data security and regulatory compliance as compared to the public cloud.

2. PwC. (2011). The future of IT outsourcing and cloud computing: A PwC study. Retrieved from https://www.pwc.in/assets/pdfs/industries/technology/thefutureofitoutsourcingandcloudcomputing.pdf (last accessed on 15 February 2017)

The risks and rewards associated with the public cloud have increased the appeal of the on-premise IaaS model.



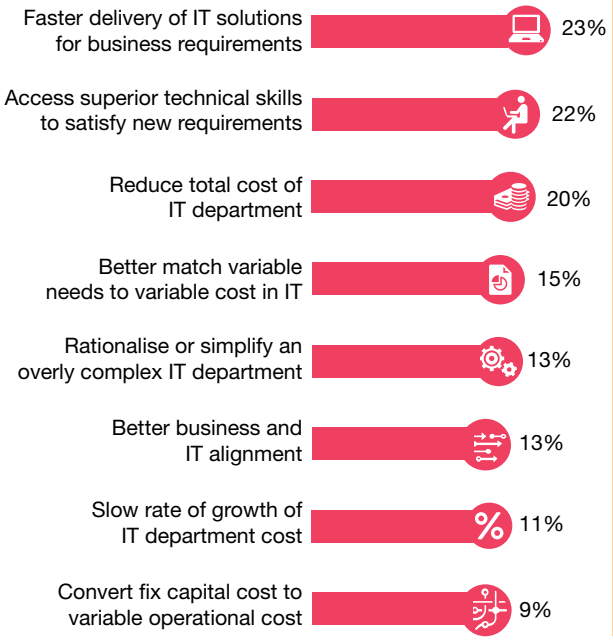
3. IDC. (2015). IDC forecasts worldwide cloud IT infrastructure market to grow 24% year over year in 2015, driven by public cloud datacenter expansion. Retrieved from http://www.idc.com/getdoc.jsp?containerId=prUS25946315 (last accessed on 15 February 2017)

The need for on-premise IaaS

Off-premise vs on-premise IaaS model

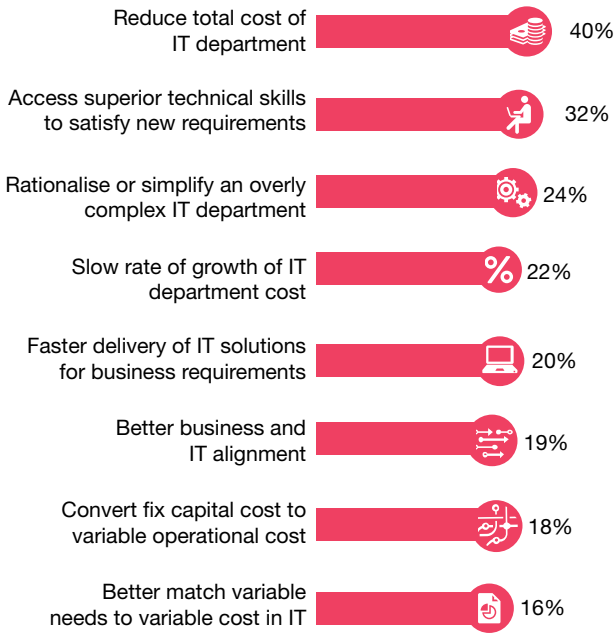
Owing to the concerns regarding data security and regulatory compliance, the decision to move to the cloud is not an easy one. A more rigorous evaluation becomes necessary when considering a move to the public cloud.

Question
Please select the three most important reasons for using private cloud managed by a service provider for IT infrastructure today.



VS

Question
Please select the three most important reasons for using external service providers for data center today.



The results of PwC's survey highlight the considerations of the C-suite when taking the decision to adopt the on-premise model as opposed to the off-premise model for IT infrastructure.

IT managers need to decide which workloads to keep on premise and which to shift off premise. There are workloads that will need rapid scale up and implementation with the cost-effectiveness of an off-premise model. These workloads that will require privacy and security of one's own on-premise single-tenant data centre.

Let us consider two cases from the regulated industry—government and banking, financial services and insurance (BFSI). In both cases, we observe that for similar kinds of business workloads, there may be varying requirements on parameters such as availability and security, and the preference for on- and off-premise IT models co-exists.

	Scalability	Availability	Regulatory	Workload	Data visibility	Preferred model
Citizen applications	√	√	√	√	√	On premise
Internal applications	X	X	X	X	√	Off premise
Reporting applications	√	√	X	√	√	Off premise
Vendor applications	X	√	√	X	X	Off premise
Document management	X	√	√	√	√	On premise

IaaS evaluation for government sector workloads

	Scalability	Availability	Regulatory	Workload	Data visibility	Preferred model
Customer applications	√	√	√	√	√	On premise
Internal applications	√	√	√	√	√	Off premise
Reporting applications	√	√	√	√	√	Off premise
Vendor applications	X	√	X	X	X	Off premise
Document management	√	√	√	√	√	On premise

IaaS evaluation for BFSI sector workloads

Note: The above tables are indicative of the requirements of most organisations in the specified sectors. The needs of individual companies may differ.

Both the government and BFSI sectors appear to have a healthy mix of workloads suited to both the off-premise (public cloud) and on-premise models. This holds true for all other industries. Certain business- or mission-critical workloads need to be stored on premise. IT managers today realise that one solution cannot meet all the needs of an organisation. Some workloads need an off-premise solution and others, on-premise placement.

Organisations need to appreciate the importance of on-premise pay-per-use IaaS models to remain competitive in the market.

On-premise IaaS model

In the on-premise IaaS model, infrastructure with related solutions (often involving platform solutions) is offered as a service with periodic billing and no upfront payout. This gives companies cloud-like flexibility, along with the guarantee of enterprise-grade support and security of on-premise models. In addition, companies gain the flexibility to rapidly add capacity as under an off-premise (on-demand public cloud) model.

Under such a model, a vendor becomes an extendable arm of the organisation, helping to scale up or scale down the infrastructure in alignment with business requirements. Often, the vendor also provides a portion of the capacity on the cloud to accommodate for unforeseen hyper growth.

The benefits of such a model include:

- Pay-per-use model with periodic billing, allowing companies to align cash flow and build unit economics models right through to the IT and infrastructure cost
- Predictable periodic billing based on units consumed, as opposed to the unpredictable transaction-based billing algorithm on the cloud
- Ability to quickly hyper scale with an onsite buffer or public cloud in times of high demand
- Faster TAT for capacity scale up, as the internal approval processes for capacity augmentation or technology refresh are often not needed
- Security, control over data and choice of technology and infrastructure
- Release of capital for other business initiatives that would otherwise be invested in IT infrastructure
- Assurance of enterprise-grade support to keep infrastructure running with a focus on core business
- Pre-negotiated price for infrastructure augmentation for 3–5 years, leading to better financial planning and efficiency, as opposed to the public cloud, where billing models can change anytime

The key sectors where this model has seen an immediate fitment include all BFSI-, government-, pharma-, healthcare- and R&D-oriented companies. For most of the other industries, where technology is not core to their business models and control over security is not a major concern, this service model can serve as an interim step to adopting the cloud. It can also act as a test bed for new IT initiatives within organisations to allow a phased roll-out approach with staggered capital spend, rather than an outright purchase IT model with high capital investment and higher risks.

Telefonica is a Spanish broadband and telecommunications firm with over 23 million consumers and 4,50,000 business users. Through their brand O2, they aspired to empower their clients with IaaS, SaaS and mobility services.

For them, the need of the hour was to match the growth of customers with their internal IT resources. The main objective was to not turn down new customers due to a lack of IT resources. One of the constraints was to keep the data on-premise and not opt for the cloud. Effectively, they required an infrastructure service that would offer:

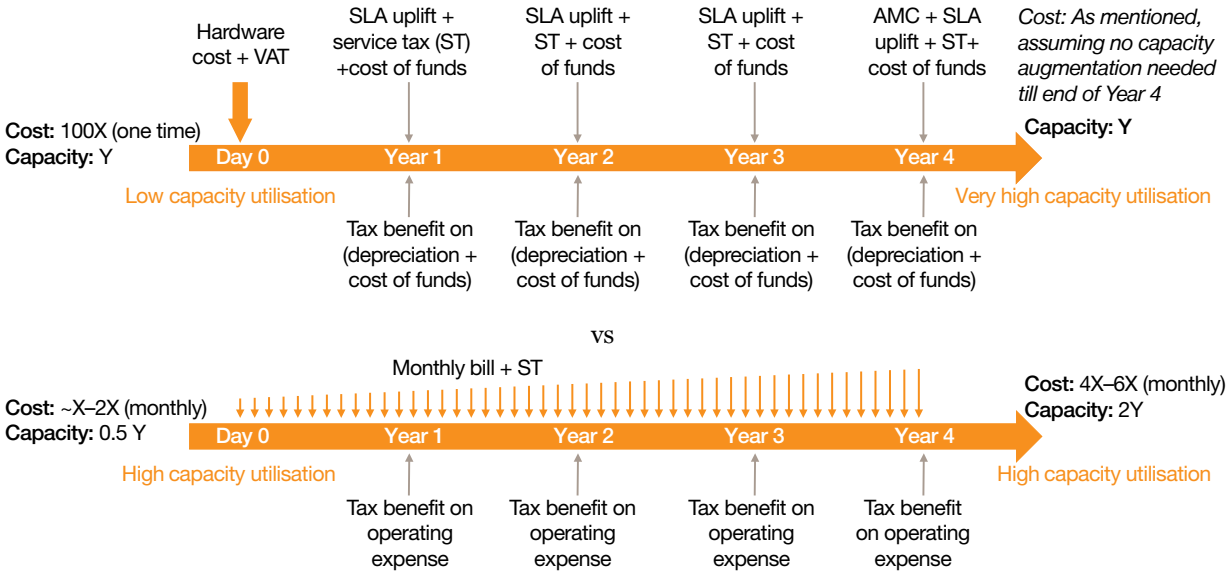
- On-premise data centre infrastructure
- Rapid scaling of infrastructure
- A predictable billing model
- Assured support levels

Telefonica used HPE's Flexible Capacity solution which provided infrastructure on-premise as a service. In this service, HPE owned and provided the infrastructure inside a data centre and offered assured support. This helped Telefonica to share the financial risks of owning the IT resources with HPE and not worry about enterprise-grade IT support. Along with the forecasted capacity, a small amount of buffer capacity was also provided. This buffer allowed service users to scale their capacity up and down as per demand and to respond to unexpected spikes.

Financial benefits of the on-premise IaaS model

As companies begin to explore options of on-premise IaaS, a financial assessment will be necessary. The two aspects of comparison that usually assume importance are (1) total cost of ownership (TCO) and (2) accounting treatment.

The components of cost incurred for upfront purchase include hardware cost, AMC, support costs, taxes applicable and cost of funds. The cost of hardware (including taxes) is incurred on day 0 and the other costs of SLA uplift, AMC and benefits from depreciation and interest are borne yearly.



Note: 1. Typically, three years of support are included as part of the contract.
2. An SLA uplift is required in many cases in order to get enhanced support.

In a service-oriented model, the organisation begins with a lower-than-forecast capacity and payments are made every month. The initial monthly payments are expected to be low as they are made against the capacity utilised. As the organisation's demand for IT resources increases, the on-premise capacity also increases. There is a flexibility to quickly increase capacity as needed by the organisation. Monthly payments will accordingly increase.

The latter model will have a zero upfront payment and will have periodic staggered cash outflows, resulting in benefits such as:

- **Better cash flow:** There is no upfront investment in capacity which makes cash available to the business. Additionally, since cash outflows are linked to usage, there can be better planning and control.
- **Improved project economics:** As the cash flows are periodically deferred and aligned with capacity used, the payback period is lower, internal rate of return (IRR) is higher and net present value (NPV) of total cost is lower compared to an outright purchase of capacity on day zero.
- **Lower overheads and other costs:** Due to lower initial infrastructure, the costs of power, upkeep, cooling and space can reduce.
- **Tax benefits:** In the Indian tax regime, since infrastructure is offered as a service, VAT is usually not applicable but service tax is (along with Swachh Bharat Tax and Krishi Kalyan Tax). Though there is no tax benefit due to depreciation, tax benefits can be availed of in cases where the services billed are treated as operating expenses. Depending on the applicability, an organisation can derive benefits on tax credit. Also, with the proposed roll-out of GST, all organisations will be eligible to take the credit for the full amount of GST paid. *(Note: Further details are presented in Appendix A.)*

Accounting treatment

In many of the as-a-service arrangements, the infrastructure will be dedicated to a particular customer. The customer will have to assess whether they have the ability or right to operate the infrastructure or have the ability or right to control physical access to the infrastructure. Existence of such rights could result in these arrangements being classified as leases.

With the introduction of Indian Accounting Standards (Ind AS), as-a-service IT infrastructure arrangements could be accounted differently. Under earlier accounting standards (Indian GAAP), these arrangements will be accounted as service arrangements. The fees paid by a customer to avail of the services will be recognised as an expense in the profit and loss statement. However, under Ind AS, depending on the individual facts and circumstances, these arrangements could be treated as service arrangements or lease arrangements.

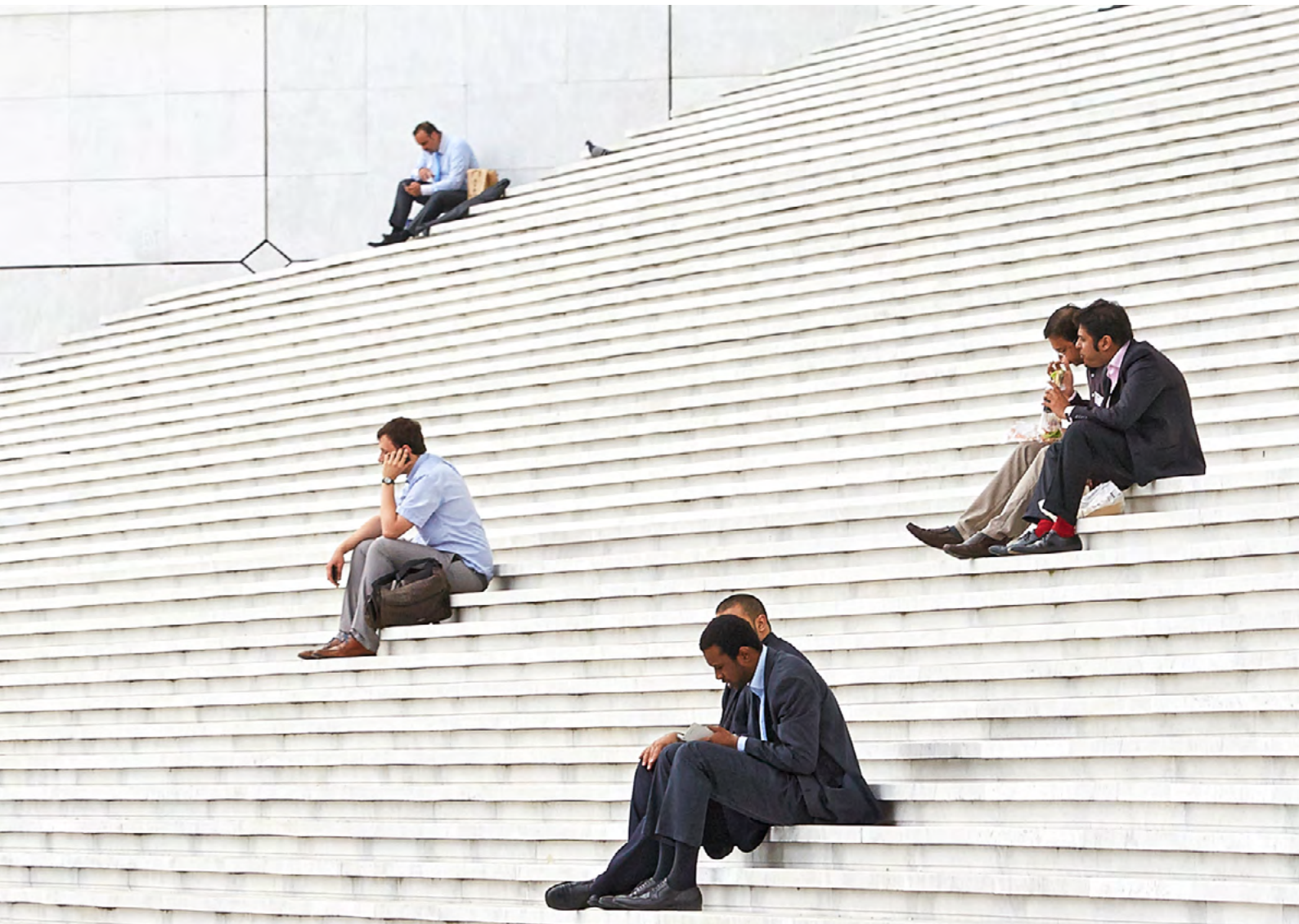
Ind AS contains specific guidance to customers on this assessment. In many of the as-a-service arrangements, the infrastructure will be dedicated to a particular customer. The customers will have to assess whether they have the ability or right to operate the infrastructure or to control physical access to the infrastructure. Existence of such rights could result in these arrangements being classified as leases. Also, customers will have to evaluate the pricing arrangements. In case the price is not fixed per unit of output or if it is equal to the current market price at the time of delivery, this situation could result in leases. Special attention will need to be given to long-term arrangements where the price is fixed for multiple years with variable pricing or guaranteed return to suppliers. Such arrangements could result in finance leases requiring that assets are recognised in the financial statements of the customer even though legal ownership of the assets is with the service provider, with a corresponding liability for future payment obligations.

When assets are not dedicated to the customer or other conditions of the lease mentioned above are not met, these arrangements will be considered as service arrangements. In this situation, the fees paid by the customer for the services will be recognised as expenses in the profit and loss statement.

Conclusion

Traditionally, IT teams have supported business teams in improving their processes and reducing costs. However, the new digital technologies require IT to play a role in driving the revenue-generating initiatives of businesses. In order to maximise the benefits of these initiatives, IT teams need to focus on reducing their TATs and control costs. To support this requirement, vendors who supply IT infrastructure will need to be a part of the organisation. Such a change requires organisations to shift from a procurement-oriented culture to a service-oriented culture.

Today, organisations have begun to embrace the idea of service-oriented models. The most popular IaaS model is the public cloud; however, it may not be the best fit for all the needs of an organisation. There is a need for an on-premise IaaS model of IT consumption which merges the benefits of both traditional on-premise and off-premise (public cloud) models. Such an IaaS model gives organisations the flexibility to grow, does not require large upfront capital and provides the convenience of pay per use. Thus, organisations will be able to leverage the benefits of control and compliance by having on-premise infrastructure and, at the same time, benefit from the pay-per-use model similar to that of cloud services. Effectively, this will enable IT to align with businesses as a partner and bring in the required elements of agility, scalability and security—the need of the hour in this digital era.



Appendix A

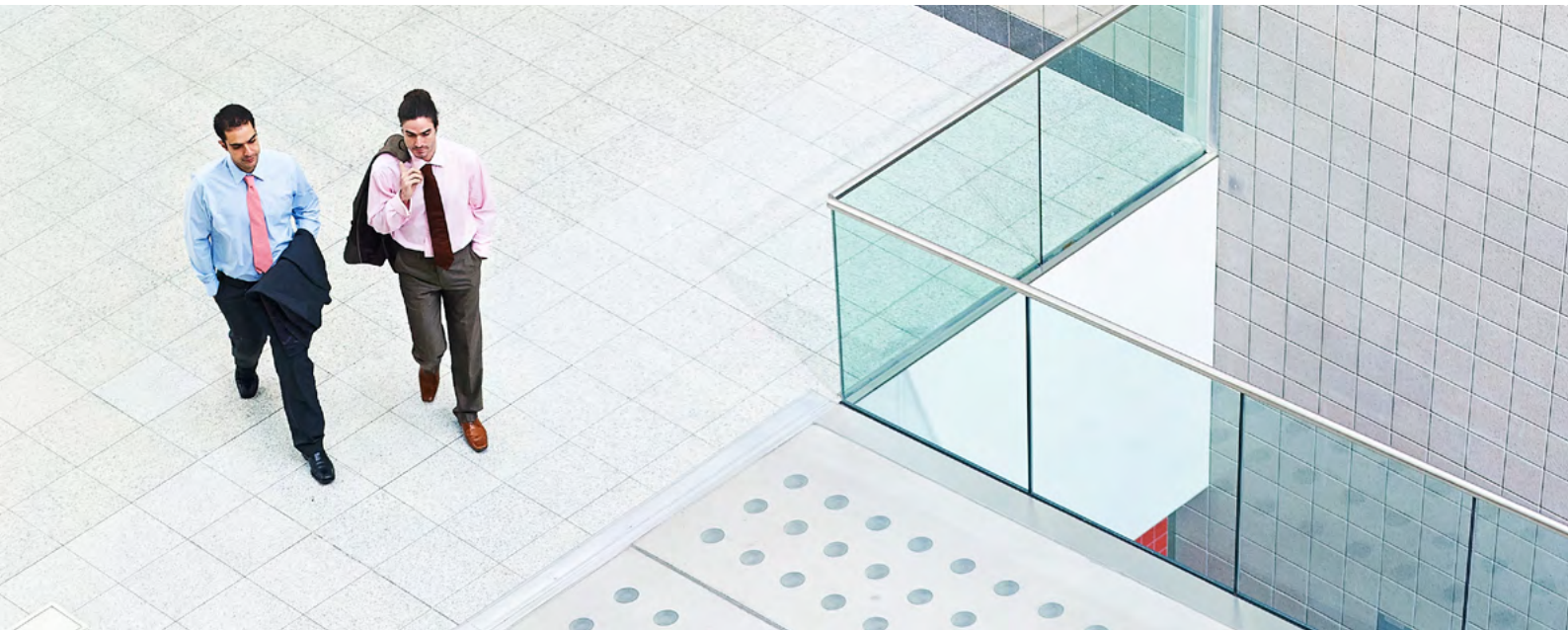
This section presents the indicative cash flows in the cases of traditional infrastructure purchase models and service-oriented models. It is assumed that same 100 million INR are invested in capacity in the case of the upfront investment model. The infrastructure technology obsolescence is assumed to be 4 years, as usually witnessed in many companies today. It is assumed that capacity is planned for 4 years and that infrastructure will reach full utilisation (includes buffer capacity) by the end of 4 years. In case of upfront purchase, since there is a huge cash outflow on day 0, it is assumed that the amount is funded in a 70:30 debt to equity ratio. Accordingly, the calculation is as follows:

Calculation of TCO in an upfront purchase of infrastructure

Capex costs (taking the hardware cost = 1,00,00,000 INR)	Rate	Day 0 cost (INR)	End of Y1 cost (INR)	End of Y2 cost (INR)	End of Y3 cost (INR)	End of Y4 cost (INR)	Total 4 year cost (INR)
Hardware cost (upfront) with embedded support	1,00,00,000						
VAT on hardware	6.00%						
Equity repayment (D/E: 70/30)		31,80,000					31,80,000
Debt repayment over 4 years (incl. VAT)			18,55,000	18,55,000	18,55,000	18,55,000	74,20,000
Repayment interest at a flat rate of 10%			6,49,250	4,63,750	2,78,250	92,750	14,84,000
Tax benefit on interest @34.61%			-2,24,705	-1,60,504	-96,302	-32,101	-5,13,612
Depreciation @60% [1]	60.00%		63,60,000	25,44,000	10,17,600	4,07,040	
Tax benefit on depreciation @34.61%	34.61%		-22,01,196	-8,80,478	-3,52,191	-1,40,877	-35,74,742
Cash flow		31,80,000	78,349	12,77,768	16,84,756	17,74,773	79,95,645

Calculation of TCO for capex investment in IT infrastructure

In the above calculation, the organisation invests 1,00,00,000 INR in infrastructure, which includes servers and data storage. Under the current taxation regime, VAT of 6% is levied on the purchase. A depreciation rate of 60% is used to calculate the depreciation, as guided by the IT Act, 1962. The tax benefit on depreciation is then calculated using the corporate tax rate of 34.61%. The return on equity for the cost of funds is assumed to be a flat 7%. It must be noted that tax benefits on depreciation are almost eroded by the cost of capital in this case. So, ultimately, the TCO is nearly same as the upfront cost incurred.



Calculation of TCO in a service-oriented model

Assuming that similar capacity can be made available at 30,00,000 INR per year and that full capacity will be needed only on year 4 (includes buffer), the table below demonstrates the expected cash flow and concomitant benefits. For Year 1, we have assumed that only 50% of the capacity will be used, so the estimated billing in the service-oriented model will be about 15,00,000 INR. But, as the requirements increase, it is assumed that the full capacity requirement will be reached by the end of the fourth year (as in the case above for upfront purchase) in the manner presented.

Billing tier	Rate	Day 0 cost (INR)	End of Y1 cost (INR)	End of Y2 cost (INR)	End of Y3 cost (INR)	End of Y4 cost (INR)	Total 4 year cost (INR)
Equivalent capacity utilisation in the upfront purchase model (by year)			50%	73%	88%	100%*	
Annual services billing			15,00,000	21,75,000	26,25,000	30,00,000	93,00,000
Service tax* @15%	15%		2,25,000	3,00,000	3,75,000	4,50,000	13,50,000
Tax benefit on operating expense	34.61%		-5,97,023	-8,56,598	-10,38,300	-11,94,045	-36,85,965
Cash flow		0	11,27,978	16,18,403	19,61,700	22,55,955	69,64,035

**100% capacity utilisation includes necessary buffer capacity.*

Cash flows for a consumption-based model for IT infrastructure

Please note: The calculations are merely for illustration purposes; the market rates may differ and cash flow may have more elements for calculation.

The above shows the cash flow of an organisation that has chosen a consumption-based model for IT infrastructure. Based on the capacity used, the service provider is paid on a monthly basis. Based on the growth in IT requirements, the total amount paid by the organisation increases each year. The above calculation also assumes that the contract with the vendor allows the company to treat the yearly billing as an operating expense.

TCO comparison of service-oriented model and capex procured infrastructure

As seen in the above calculations, the cash flow in the case of service-oriented models is usually better and allows for the flexibility to increase or decrease as required. In this case, the NPV of the TCO in the case of upfront purchase is about 29% higher than that of the service-oriented model.

	Day 0 (INR)	Year 1 (INR)	Year 2 (INR)	Year 3 (INR)	Year 4 (INR)	Total (INR)
Upfront purchase model	31,80,000	78,349	12,77,768	16,84,756	17,74,773	79,95,645
Service-oriented model	0	11,27,978	16,18,403	19,61,700	22,55,955	69,64,035
Cash flow difference (Upfront model cost – service-oriented model cost)	**31,80,000**	**-10,49,629**	**-3,40,635**	**-2,76,944**	**-4,81,182**	**10,31,610**
NPV (upfront model) Calculated @10%						58,88,981
NPV (service-oriented model) Calculated @10%						45,77,949
SOM NPV advantage						13,11,032
% SOM NPV advantage						29%

In the comparison above, it is assumed that the maximum capacity is reached at the end of year 4. If not so, in the case of upfront purchase, because the turnaround time for capacity augmentation is typically higher, there may be a high opportunity loss to business. But in the case of the service-oriented model, the capacity can be augmented quickly and businesses can respond to market appropriately.

Appendix B

Tax treatment of IaaS

From an indirect tax perspective, since the on-premise IaaS is a service model, service tax will be applicable. Under the current tax laws, a business may be divided into three categories: (i) trading entities, (ii) manufacturing entities and (iii) service providers. Currently, in the case of a service-oriented model for infrastructure, the supplier charges service tax at 14%, Swachh Bharat Cess (SBC) at 0.5% and Krishi Kalyan Cess (KK) at 0.5%. Creditability for each component has been discussed below:

- Trading entities: Not eligible to take credit of service tax (including SBC and KKC) at 15%.
- Manufacturing entities: Service tax at 14% is eligible to be taken as credit. However, SBC/KKC at 0.1% cannot be taken as credit and are hence accounted as a cost.
- Service providers: Service tax at 14% and KKC at 0.5% are available as credit. However, SBC is a cost for the service provider.

With the proposed roll-out of GST in the near future, such distinction between trading and manufacturing service providers will be eliminated. Under GST, all three types of entities should be eligible to take the credit for the full amount of GST paid on procurements under a service-oriented model for infrastructure (subject to fulfilment of certain conditions).

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