Scaling Business Technology Framework with IaaS

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Introduction

The future-ready IT must symbolise a maturity level that will enable enterprises to extract maximum benefits from digitalisation. IT setups need to integrate closely with business drivers. In such a setup, multiple layers of business technologies also communicate seamlessly with the external environment, via a digital interface. The IT solution must also be agile to meet the rapidly changing enterprise and market demands.

It is due to the inability of traditional captive IT to support unpredictable business growth that service-oriented cloud models – Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) – have become more popular.

Organisations in both the private and public sector have been increasingly adopting these 'as-a-service' models that allow them to shift from asset ownership and upfront capital expenditure (CapEx) to a consumption-oriented operational expenditure (OpEx).

Infrastructure as a Service – Overview and Benefits

IT infrastructure is one of the chief foundations for the as-a-service cloud model. IaaS is a standardised, automated service where computing, networking and storage resources are hosted and owned by a cloud service provider and delivered to users on demand.

Businesses can self-provision the service with a web-based graphical user interface that becomes the IT operations management unit for the whole tech environment. Access to a set of protocols and tools to build new software applications may also be provided as an option.

The setups for IaaS can vary between full-blown compute as a service and partial infrastructure as a service for servers, storage, web hosting, desktops, networking and disaster recovery. To deploy IaaS, the organisation can choose public, private or hybrid cloud environment as per its budget and security priorities.

Key Benefits of IaaS Adoption

Servers, storage, network and related applications are the essential components that add costs for IT projects deployments.

Their purchase calls for well-forecast budget estimates and, possibly, a long process for approval. Besides, an organisation that owns significant hardware and software may get stuck with it for years—to extend the ROI—even if the technology advances to another level. The estimation of future capacity requirements with static hardware or software can be challenging to make.

Such drawbacks of the CapEx-based IT infrastructure have made IaaS relevant for organisations of all sizes. Enterprises that are undergoing digital transformation with big data, IoT initiatives, advanced analytics, mobility and social media marketing can leverage IaaS to achieve their business goals cost-effectively. It helps a business in multiple ways:

Seamless Scalability:

IaaS enables quick on-demand scaling and is elastic with provisions for sudden breakdowns and unprecedented spikes in usage.

Vendor Management:

An offsite vendor owns and maintains the entire infrastructure throughout the contract, reducing the workload of the organisation's in-house IT team. The vendor works for round-the-clock availability of the service with SLA-backed enterprise-grade support and security and passes on the benefit of the latest technology upgrades to the organisation. With this, the organisation can also avoid the outflows on equipment warranties and annual maintenance contracts (AMC), and shadow IT gets eliminated.

Reduced TAT:

The TAT to introduce new business applications in the market gets diminished as the long procurement cycle for IT infrastructure is eliminated.

Cost Savings:

With usage-based pricing, the bill is calculated for the actual infrastructure units that get used.

Difference between IaaS and PaaS

Both IaaS and PaaS provide cloud computing. However, these are at different layers.
The *PaaS model offers a computing platform comprising application building blocks like databases and file sharing, in addition to the apps that run on the platform.*
On the other hand,
IaaS provides only the infrastructure building blocks. These include components for storage, hardware and networking.

IaaS and PaaS are related as they support infrastructure, applications and platforms that cannot function without each other. This has also led to some speculations that the two will ultimately merge into a single layer of service. Amazon did add some PaaS functions to its IaaS platform, while Microsoft added an IaaS platform to its Azure PaaS.

Integrating two (or possibly three) layers of cloud solutions is a trend that is expected to grow with time. Moreover, the early adoption of cloud infrastructure will help enterprises prepare better for the benefits that this technology will confer in the immediate future.

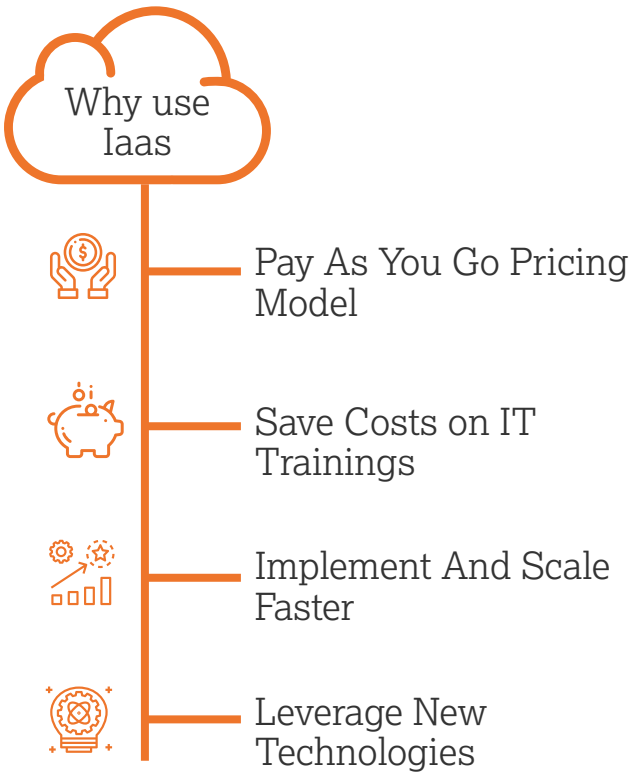
Business Scenarios for IaaS

IaaS provides an excellent opportunity for cost reduction essential for all enterprises. With its billing-as-per-usage model, they don't have to pay for any unused capacity. Also, there are no costs to upgrade the infrastructure, no long-term service contracts to fulfil, and low, if any, virtualisation licensing fee. Organisations can also avoid delaying their projects for want of capacity and don't have to hire additional staff to manage the IT infrastructure.

While adopting IaaS for cost savings, organisations must work out comprehensive cost-benefit analysis considering all aspects. These include the amounts they can save by not purchasing, maintaining and overhauling their equipment, as also the labour costs involved in the management of on-premise infrastructure.

When a business knows that a major growth stage is on the horizon, it can calculate its total-cost-of-ownership for IT infrastructure and compare it to that of a scalable IaaS subscription.

Businesses that need to react quickly to changes in their market can also consider adopting IaaS. When their infrastructure is in the cloud, they can build a system quickly, create or troubleshoot a product on short notice and assign new employees to virtual machines in hours.



IaaS is also a smart choice to consider when the enterprise data centre is due for a total overhaul or upgrade. At that time, the decision-makers for a business must evaluate if it is logical to continue managing their data centre and involve salaried staff in the same.

If new technologies can be imbibed resourcefully through IaaS, it is worthwhile to consider the cloud solution.

IaaS across Industries: Manufacturing, Healthcare, Media and Retail

As per the TechSci Research report, *India Cloud Infrastructure as a Service (IaaS) Marketed by Type, by Solution, by User Type, Competition Forecast & Opportunities, 2011–2021,* the Cloud Infrastructure as a Service (IaaS) market in India is anticipated to expand at a CAGR of over 10% during 2016 – 2021.

While several segments such as banking, financial services and insurance (BFSI), travel & hospitality, manufacturing, education, healthcare, retail and logistics are leveraging IaaS, this paper will focus on its applications in three major industries:

Manufacturing

IaaS affects practically all aspects of manufacturing companies. At the enterprise level, it influences the way organisations manage their operations – from enterprise resource planning (ERP) and financial management to workforce training and data analytics.

At the manufactured product level, it transforms product research, design, prototyping and development. Conventionally, manufacturing has been an iterative process comprising design, test, redesign, test, fail, and repeat steps. With IaaS-based design and 3D prototyping, manufacturers can shorten and even eliminate this painful procedure. IaaS expedites and aligns new production setups based on additive manufacturing, generative design and Industrial IoT.

In another application, IaaS can facilitate the integration of supply chains and the data that streams from IoT-enabled manufacturing equipment on factory floors. It is easier to integrate data from multiple partners, platforms and devices if it is stored in well-networked data centres operating in the cloud.

IaaS makes manufacturing IT systems more secure, thanks to sophisticated cybersecurity practices used by cloud service providers—these are more advanced than what companies can individually manage to implement for their technology infrastructure.

Manufacturing companies are already leveraging IaaS in myriad ways. As an example, the automotive sector uses IaaS-delivered telematics. Through cloud-based hubs, original equipment manufacturers (OEMs) can collaborate with manufacturers to share product and inventory details, generate demand and manage sales. In the consumer electronics sector, IaaS networking is being used to process and analyse customers' purchase behaviour patterns to build actionable insights. Agriculture-based organisations are using IaaS to collaborate with relevant NGOs to share information that can help farmers enhance farm yield and crop health.

Healthcare

Organisations in the healthcare industry are also moving parts of their infrastructure to the cloud using IaaS. It reduces their IT costs and gives them access to the latest versions of hardware without having to buy, configure and maintain the physical equipment in their premises.

Free from the burden of owning and maintaining their tools, healthcare companies using IaaS can continually adopt more robust technologies than what their traditional infrastructure could support. As the data – comprising patient files, medical equipment condition, transaction details, vendor accounts and employee information – increases, scalability becomes critical for organisations. With IaaS, they get a mouldable support system for their IT infrastructure and can easily accommodate growing records.

With its cloud computing abilities, IaaS can meet the capacity demands of healthcare companies while giving them controlled access to their patient data. It is a suitable option for any organisation that:

- Faces hardware updating issues due to ongoing technology evolutions
- Wants to implement electronic health records (EHR) solutions in complex environments
- Is short-staffed due to lack of experienced IT professionals
- Needs a better business continuity plan
- Seeks a more predictable cost structure

In EHR deployment, IaaS offers specific benefits. As the vendor ensures the continued availability of records, in-house IT teams do not have to spend much time in troubleshooting and can focus on the needs of end-users in the organisation.

Media

Conventionally, the media sector invested in physical IT assets that were subject to depreciation and had underpowered software incapable of supporting high capacity. The evolution of cloud solutions allowed the industry to shift from CapEx to OpEx model for operations. Besides, today, content consumers expect HD videos with uninterrupted streaming and other innovative media formats.

Such demands impel organisations to deploy technology solutions with adequate data storage, seamless data flow, flexibility and security. Once again, cloud-oriented IaaS meets these requirements while also keeping costs in control.

Media companies – both linear and over-the-top (OTT) – have to ensure the delivery of their content in short timelines to gain a competitive edge in the market. They must also build consistent customer experience with such content irrespective of the device and screen used to access it. Using IaaS, organisations can build rich content delivery models, compatible with a range of platforms. The otherwise slow and expensive production workflow gets better traction in a cloud-based interface. By integrating network, computing and storage resources, IaaS creates a collaborative environment where different teams can work together to produce and distribute quality content. Over 79% of businesses using IaaS in India affirm that this makes innovation easier.

For the security of their clients' infrastructure in the cloud, IaaS service providers offer user authentication and secure APIs. They have a provision for backups and its automated management. Such proactive steps increase the trust of media companies and other businesses in cloud platforms.

Retail

The Internet has revolutionised the retail industry in many ways. E-commerce is competing with brick-and-mortar stores, and social media has empowered customers who can instantly influence opinions about brands.

Amidst such trends, retail players must expand beyond traditional customer relationship management (CRM), ERP and supply chain management (SCM). They must be able to identify each customer's preferences and offer personalised shopping experiences to them. That's where IaaS helps.

Retailers can leverage the storage, computing and analytics abilities of IaaS to manage massive structured and unstructured data on customers' purchase behaviour. They can also deploy interconnected point of sale (POS) systems that centralise sales and inventory information in a cloud hub. Such software provides retailers with real-time transactional data accessible from any device and helps in expediting and improving business decisions.

With IaaS, retailers get a dedicated team to monitor, maintain, remediate and upgrade their IT environment while they can focus their resources on revenue-generating activities. They also rest assured that their IT environment is constantly evolving and is safe from the threats brewing over the cyber landscape.

Popular IaaS Solutions

The term infrastructure has a broad meaning, and it is not surprising that a host of cloud-based services are under the IaaS moniker.

The popular solutions include:

Compute as a Service:

One of the most widely used IaaS offerings, Compute as a Service delivers on-demand computing capacity for servers, operating systems, routers, firewalls and load balancing. Such systems get management interfaces, and their capacity may be shared or private. As per the services offered by the vendor and the package an organisation chooses, compute as a service may also come with automated patch management and security management.

Storage as a Service:

For any business, data storage requirements only increase with time. It is challenging to maintain and manage adequate storage capacity effectively. Storage-as-a-Service solutions help by bringing interactive portals that enable IT personnel to provision storage and transmit data to various tiers of storage. They can also scale storage as required. The service providers use advanced storage techniques and have a limitless capacity in the cloud. The tiers usually comprise fast storage for high I/O apps, basic storage for system disc, and bulk storage for files. As with other IaaS components, organisations pay only for what they use. Security and high availability are assured with SLAs.

Web Hosting as a Service:

Majority of enterprises today actively use their websites for marketing and e-commerce. Any glitch in the functioning of this platform can imply business loss. By migrating a website to the IaaS model, they can save it from getting bogged down in peak traffic period.

Furthermore, they will not need to overpay for unused capacity and can, therefore, manage the traffic spikes cost-effectively. The SLA-backed, IaaS-based web hosting assures organisations of balanced loads, guaranteed uptimes, offsite backups and fast connectivity despite the amount of rich media on their portal.

Disaster Recovery (DR) and Backup as a Service (BaaS):

Organisations move disaster recovery to the cloud to ensure uninterrupted access to their data and applications in crises such as natural disasters, power outages and machine failures. For continual access and almost nil downtime, these solutions are fortified with high redundancy and automatic failover. Applications and data are securely stored in offsite facilities.

Disaster recovery as a Service (DRaaS) comes with two options: backup + restore to the cloud and backup + restore from the cloud.

The first enables the transmitting of data to virtual machines in the cloud and is the right choice for mission-critical resources that need to be recovered instantly and completely. With the second option, businesses store apps and data at their premises but back them up in the cloud. If a disaster occurs, they can restore it to the hardware in their own offices.

vUTM delivers unique benefits to businesses that are trying to strengthen their security programs. By containing numerous abilities in a single appliance on a cloud platform, it reduces the complexities of business security models. It allows for smoother migration of employees to progressively upgraded enterprise apps that they use in their daily operations.

Desktops as a Service (DaaS):

This is essentially an IaaS cloud built exclusively for hosting and serving virtual desktops. It allows organisations to provision, access, control and disable virtual desktop devices as required. They can even connect these machines through a virtual private network (VPN) rather than public Internet service. The IaaS vendor arranges for storage of these virtual machines with data protection and security while also managing bandwidth for high uptime. With DaaS, organisations get a well-managed desktop environment along with adequate data storage for new workers as the businesses scale up. Since it is accessed online, users can log on to their desktops from any location.

Servers as a Service:

Organisations that access servers in the cloud can always get adequate computing power for projects of any size. It is an excellent choice for one-time tasks that call for extra capacity as also for managing spikes in business transactions across different sale seasons. They pay only for what they use. 'Servers as a Service' also helps enterprises to reduce their IT administration and maintenance workload. This support is significant where business servers need comprehensive and costly system administration.

Networking as a Service (NaaS):

A new feature of the IaaS solutions, NaaS offers unified connectivity across networking, storage and servers and can be customised to meet the needs of virtual infrastructures. It is used to provide networking resources as required for supporting virtual firewalls, WAN acceleration services and load balancing. The NaaS delivered by some vendors is also compatible with other network-based auditing and monitoring solutions. As with other IaaS services, scalability, flexibility and security are built in, and there are no upfront costs.

The Migration Process

With an experienced vendor on-board, the transition from on-premise infrastructure to the IaaS landscape is not an overwhelming process. To begin with, the service provider has to virtualise the existing IT environment – comprising servers, applications and desktops – if the organisation has not already done this. Once the virtualised IT components separate from the physical machines on which they reside, it is easier to choose the high-priority applications that must be moved to IaaS. Concurrently, the virtualisation process also initiates the cultural shift that leads employees to access data and applications through virtual equipment and migrate to a service-oriented mindset that characterises cloud deployments.

The next step is to identify the software and applications versions that are used throughout the environment, the teams authorised to use them, and the interdependencies between those applications. This process also involves the identification of interdependency between applications and the data infrastructure to determine the migration plan architecture where those interdependencies do not get disrupted.

The vendor then gathers and assesses the data on every application's resource utilisation level in terms of the CPU power and the memory it consumes. Moving forward, IT segments of the organisation will require storage and network metrics, particularly where they express latency and throughput. The data is vital in deciding how the applications will function in the new setup.

The cloud-based infrastructure must be compatible with the enterprise's existing on-premise hardware. Disparate operating systems on these may require additional changes for a successful migration.

It is also necessary to train the in-house IT staff for its changing responsibilities. Although the vendor plays an active role in managing the IaaS solutions and offers round-the-clock support, the IT teams can step in to monitor the transformed work environment, ensuring that the organisation gets optimum value from the cloud-based service.

Conclusion

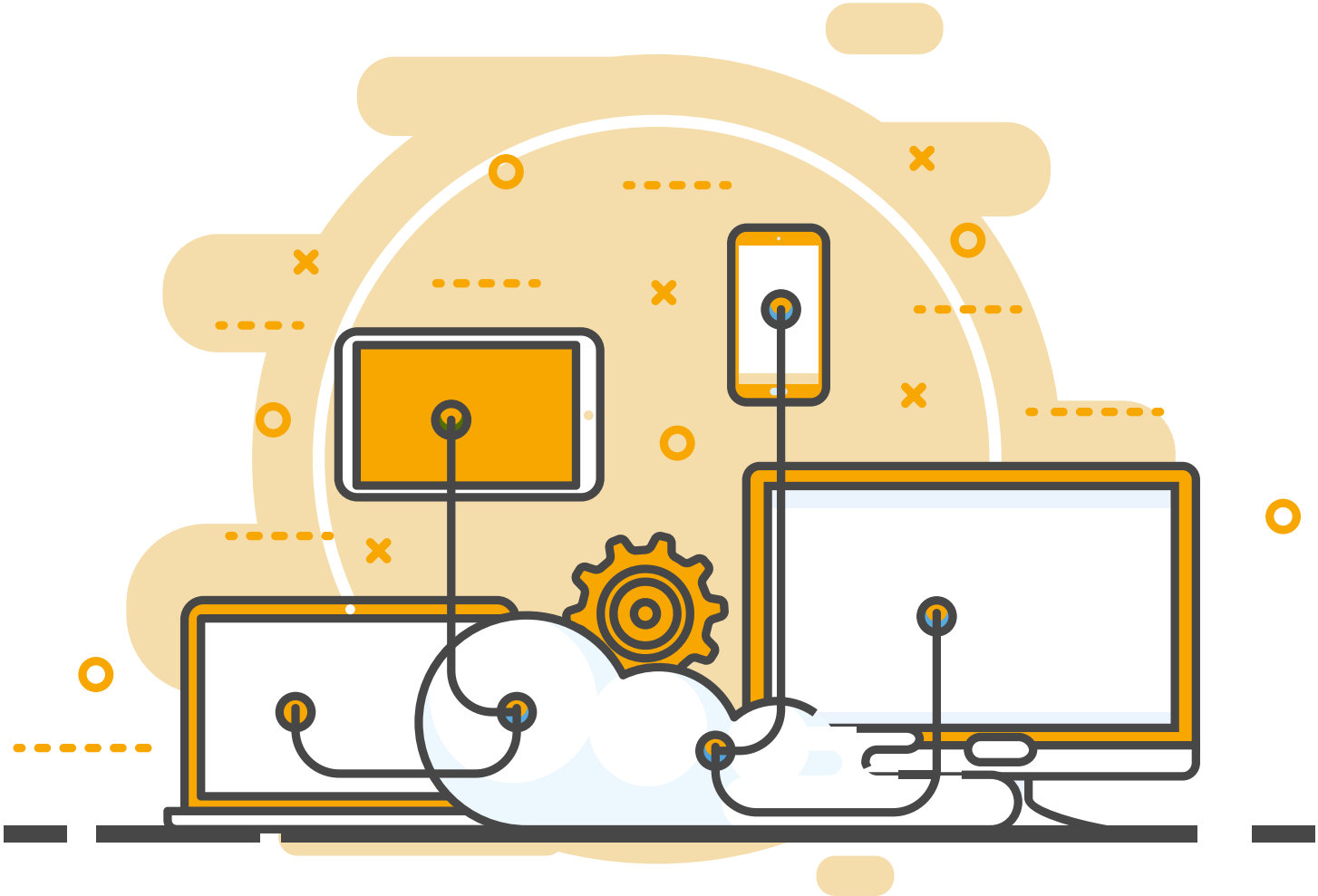
In the past decade, enterprises focused on the consolidation of their IT infrastructure with server virtualisation, which helped to condense hundreds of physical servers by a factor of ten.

For most of these organisations, migrating a part of their infrastructure to cloud platforms is the next rational step.

IaaS gives businesses the flexibility to scale, does not require significant capital investments, and comes with the convenience of pay-as-you-go option.

With guaranteed security and control, they can also stay compliant with their industry and local laws. In essence, it enables IT to remain attuned to business goals in the transforming digital era.

The *InstaCompute* tool designed by Tata Tele Business Services (TTBS) is a bespoke IaaS solution that delivers variable computing power to keep up with the changing enterprise requirements. It allows users to add or remove virtual servers, storage capacity and metered Internet connectivity. It offers the scalability, agility and security that business technology frameworks need today.



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