

The cloud: SENTECH's 4IR enabler

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Background

Cloud technology is said to be the enabler for Fourth Industrial Revolution (4IR) technologies by providing an environment to test, develop, implement, and produce products that are disruptive to the market.

Cloud technology has the potential to transform an organisation into a more efficient, cost-efficient and future-ready business than any other technology in the market, by providing better control over its IT infrastructure and higher availability. It consists of infrastructure, platforms and software services that can be used to serve customers by providing services such as PaaS (Platform-as-a-Service), IaaS (Infrastructure-as-a-Service), and SaaS (Software-as-a-Service). Examples of these types of services that consumers use on a day-to-day basis include Google, WhatsApp, online banking, Netflix, SAP, etc.

Cloud technologies have the capability to be designed and scaled on a case-by-case basis, based on the needs of the business. These include reducing the cost of IT infrastructure and/or services, or building a redundant service for day-to-day operations in case of system failures that could cost the business in terms of lost revenue or penalties.

History

Cloud computing is not a development of the 21st century, but was conceived as far back as the 1950s, when multiple users would connect to a mainframe to access data. The reason was that mainframe computers were very costly at that time, and users only needed small amounts of data and processing power to work; it therefore made sense for them to share the mainframe.

During the 1970s the hardware virtualisation concept was created, allowing multiple operating systems to be executed on the same physical hardware, thus optimising the use of the hardware and keeping costs down. Hardware virtualisation is a core concept in cloud computing and, starting in the 1990s, telecommunications companies were able to allow multiple users access to their network not by scaling up hardware, but by optimising and virtualising services, thus reducing costs and providing users with shared resources.

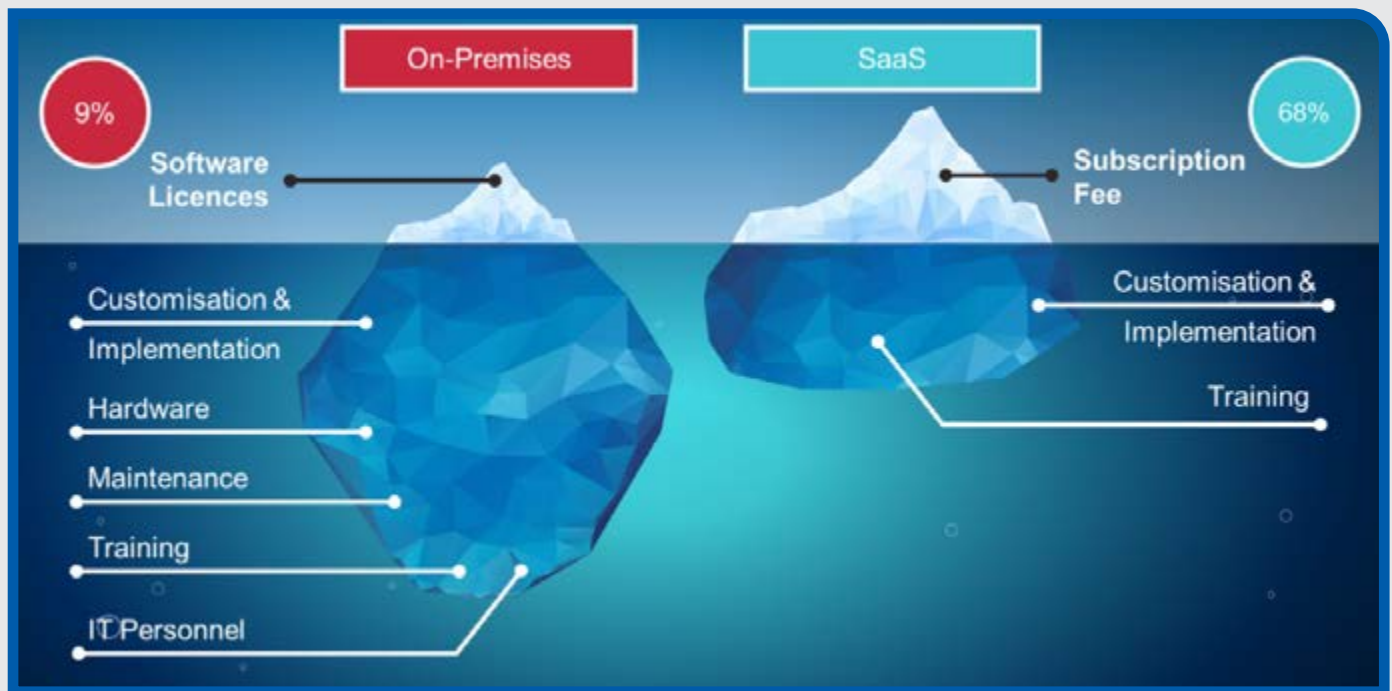
Source: <https://www.ibm.com/blogs/cloud-computing/2014/03/18/a-brief-history-of-cloud-computing-3/>

Cloud (SaaS) vs on-premises equipment

Hosting equipment on-site was an industry norm for a long time as this allowed companies to secure their IT infrastructure, and have in-house trained IT specialists to manage and maintain devices, and control costs.

But in the past 30 years, the digital boom has accelerated the need for more powerful computing power, bigger storage, and faster networking to keep up with customers' needs. This forced companies to invest in newer IT infrastructure at a faster pace than envisioned. Companies did not have the capacity to scale up, and demand outstripped supply; a new solution had to be developed.

Industry players such as Amazon Web Services (AWS), Google, Microsoft, IBM, and Huawei offer public cloud infrastructure that is scaled worldwide to provide better performance, with better latency (in other words, less "lagging"). Private cloud refers to when companies want to integrate their own on-premises equipment with the cloud, creating a private hybrid cloud environment. This enables them, to hold on to their own equipment and enjoy full cloud redundancy.



Source: <https://staging.prescience.com.au/on-premises-vs-cloud-which-is-right-for-you/>

SENTECH and cloud technologies

SENTECH has used cloud technologies as part of its product portfolio, such as streaming events like GovTech 2019, where cloud media transcoding and streaming modules were utilised to stream the event online, and in production software such as SAP Concur and Microsoft Office 365 that SENTECH uses daily.

The next evolution is to bring cloud technologies even closer to SENTECH's borders. Thus, the Research and Innovation department has teamed up with AWS to implement SENTECH's own private cloud environment, namely AWS Outposts with the vision of bolstering its product portfolio and aligning with its future vision. It will reside at SENTECH's data center at Nasrec. Introducing Cloud technologies will:

1. Allow for low-latency computing.
2. Provide data residency (the physical location data).
3. Local data processing.
4. Migration and modernisation of IT resources.

Source: <https://aws.amazon.com/outposts/>

Use cases

4IR technologies require a platform with large amounts of computing power and storage to process and store gigabytes of data from various outputs, that can process the data locally to generate value in the forms of algorithms and/or predicted analysis, and has software service to support use cases. SENTECH has thus envisioned various 4IR technologies to be used within the organisation and productised for customers, such as the Internet of Things (IoT), edge computing, 5G private networks, mixed reality, artificial intelligence (AI), machine learning (ML), and industrial automation.

SENTECH anticipates using AI and ML to provide predictive analytics on information or data generated and collected through the Network Monitoring System, to gain knowledge of trends and patterns within the network, and possibly predict when certain failures would occur.

It also sees SENTECH using scalable cloud computing resources and software services to develop an IoT platform that would provide analysis from sensors in the field and equipment being brought into a new platform, which can be used to centrally control and monitor the network using legacy sensors and devices.

SENTECH can also create a lab-like environment where development and testing is simulated, such as building and testing Open 5G RAN and CORE concepts by virtualising services that would otherwise have required the purchase of additional equipment. This would allow SENTECH to conduct and test quicker product development, at a fraction of the cost.



Conclusion

Cloud technologies at SENTECH will be the driving force behind launching new and innovative products, creating a more resilient network for its customers, and allowing SENTECH to provide better services for customers from all sectors thus keeping South Africa connected.