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DECODING THE CLOUD COMPUTING ARCHITECTURE

Executive Summary

Cloud computing is everywhere. Be it the Gmail inbox, social media posts and feeds, or movies and web series streaming, it all behests on Cloud technology. It enables businesses to thrive on the back of scalability and unbeatable productivity. As a billion-dollar industry, there is a lot to the Cloud.

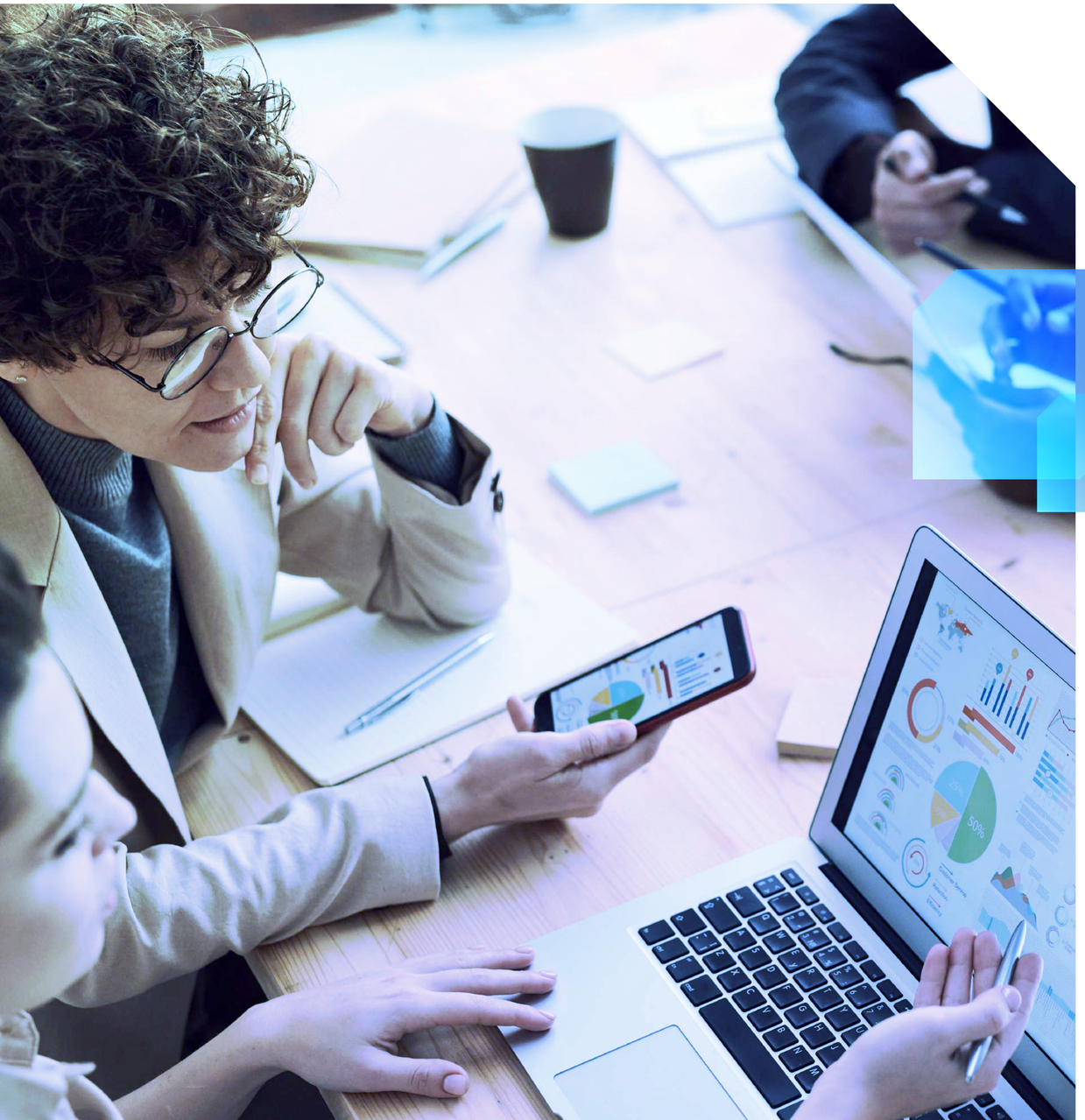
It includes databases, servers, analytics, applications and others that operate through an advanced infrastructure. The primary purpose is to render on-demand virtual computing resources. But what makes Cloud computing a preferred choice for many corporations is its several benefits, including cost-saving, productivity, data backups, disaster recovery, and high-end security.

The Cloud computing architecture comprises three parts: Cloud-based delivery, Front End, and Back End. The Front End and Back End components continuously communicate through a network or the Internet.

The delivery system functions through Software-as-a-Service (SaaS), Infrastructure-as-a-Service (IaaS), and Platform-as-a-Service (PaaS). The Front End caters to the end user, leveraging the user-facing aspects of the architecture, primarily the user interface. The Back End gets operated by the service provider. It handles the server-side dynamics through the application, infrastructure, service, storage management, and security.

While Cloud computing architecture is adaptive and agile and helps businesses across all mission-critical applications, much depends on Cloud deployment. Companies can opt for Private or Public Cloud. The former renders the highest customisation and control levels, and the latter is a shared network among collaborators and thrives upon a unified working environment with uniform security, privacy and performance measures. The Public Cloud is open to the general public, and the Hybrid Cloud blends private and public architectures. CTOs also have the option to choose from an on-premise Cloud and an outsourced Cloud, as per the resource requirements.

In this White Paper, we decode all major elements of the Cloud computing architecture.



Introduction

Cloud computing is an apt option for organisations and renders several benefits, including cost-saving, enhanced efficiency, data backups, disaster recovery, and security.

Unquestionably and indisputably, the Cloud is everywhere! Log on to surf through your Gmail inbox; Cloud computing is in action. On a more personal front, your social media posts, photographs saved on your devices, and the movies and series that get streamed - are all leveraging the Cloud technology. Cloud computing lends firepower to businesses that uplift their productivity. Today, innumerable teams work on a plethora of Cloud-based software.

Given this, it is no surprise that Cloud computing is a multi-billion-dollar industry that is here to stay. So, how prominent is Cloud computing?

Tipping The Surface With Statistics

Cybersecurity Ventures estimated that by 2025, about 100 ZB of data shall get stored in the Cloud with approximately 50% of the global corporate data getting uploaded onto the Cloud.

This fact shows the clout of the Cloud and its disruptive dominance in the Internet world. Also, 90% of the corporates have embraced a multi-Cloud infrastructure.

Note that the Cloud operates through an advanced infrastructure. To this end, Cloud infrastructure services have generated annual revenues of about USD 178 billion in 2021 as per the data from Synergy Research Group.

Decoding The Cloud Computing Architecture

The term ‘Cloud Computing Architecture’ refers to components that power the Cloud. It includes databases, analytics, applications, and others. Cloud computing uses a client-server architecture for delivering on-demand, virtual computing services and resources, including databases and software.

As a concept, Cloud computing architecture is designed to resolve latency issues and improve data processing requirements. In doing so, it reduces IT operating costs and renders accessibility to data and digital tools. This architecture blends service-oriented architecture (SOA) and event-driven architecture (EDA).

The architecture explicitly lays out the components and subcomponents embedded in it, divided into three parts: Front End and Back End, which communicate through a network or Internet, and Cloud-based delivery. The delivery system allows information to be transmitted between the Front End and Back End. It does this through three primary segments: Software-as-a-Service (SaaS), Infrastructure-as-a-Service (IaaS), and Platform-as-a-Service (PaaS). These segments serve as the impetus for software access, data storage, and seamless remote app development.

Moreover, the Cloud computing architecture includes several sub-disciplines, including Cloud-based security, Cloud security architecture, and multi-Cloud architecture.

Front End

This denotes the user-facing aspects of the architecture. In simple words, this is where end users interact with the components. To this end, it provides applications and interfaces. Generally, it defines how users interact with Cloud computing software. To elaborate on this, it comprises client-side applications or web browsers. It provides a Graphical User Interface (GUI), enabling end-users to perform respective tasks. Overall, the Front End architecture has three parts - software, user interface and a client device, and network.

Back End

This marks the quintessential ‘behind the scenes’ of the architecture. The Back End is responsible for monitoring all the programs that run on the Front End application. It powers the Front End architecture and includes an array of hardware, data storage systems, and servers. The Back End typically rests in a Data Center in a geographically-distant location. Lastly, the Back End gets taken care of by Cloud service providers. It comprises several components, such as:

Infrastructure

This is the engine which powers all the Cloud software services. It includes computing components such as the Central Processing Unit (CPU), Graphics Processing Unit (GPU), motherboard, and others that render smooth functioning. These include network cards and additional specific accelerator cards according to the use cases.

Applications

Depending on the client’s requirement, this can either be software or a platform. The function of the application is to produce the desired result, along with resources, for the end-users. This component generally refers to the interface offered to the end user, except on the server side. This layer coordinates the varied consumer needs with resources in the Back End.

Service

An essential component, it renders utility in the architecture. The ‘service’ aspect can perform varied tasks and is akin to the heart of architecture. Storage application development ecosystems and web services are among the widely used.

Storage

The storage component helps store and maintain data, including files, folders, videos, and documents. The storage capacity varies according to the service provider. Today, there are different types of storage, including hard drives, solid-state drives, and the more recent Intel Optane DC Persistent storage.

Management

The management aspect of the Back End architecture caters to the allotment of resources toward specific tasks. In simpler words, it does the rationing by ensuring optimal utilisation of resources. It gets tasked with simultaneously performing varied functions of the Cloud environment. It handles several components, including application, task, service, security, and data storage, and helps establish coordination among these resources.

The ‘management’ aspect is the ‘middleware’ which interfaces between the Back End and Front End. It divides the system resources seamlessly and dynamically.

Security

This is the most crucial aspect. It ensures end users access safe and secure Cloud resources, systems, files, and infrastructure. This component also implements security management to the Cloud server through virtual firewalls, preventing data losses and breaches. The security aspect helps with easier debugging when issues arise with the system. The systemic structure also ensures that mission-critical tasks do not get interrupted. Typically, this happens through virtual duplication of the system, ensuring task redundancy.

Entering The Stream of Cloud Deployment

By Models -
The Cloud Software architecture can vary as per the deployment model chosen, and there are four primary types.

Public Cloud

A Public Cloud is accessible by any paying customer. The Public Cloud operates as a single divided server that hosts many different partitions, each available for use. The different Cloud instances do not get separated through firewalls, making them open to the general public.

Private Cloud

Similar to the Public Cloud, this one requires permission, meaning that only individuals from a specific corporation or association can get server access. Like the Public Cloud, the service gets provided by a third party. The difference is that they get protected through several security features and firewalls, preventing unauthorised access to mission-critical systems.

Community Cloud

The Community Cloud gets shared between multiple companies. It is ideal when several corporations collaborate on a specific project. The Cloud maintains a unified development and working environment across enterprises. It devises similar parameters for privacy, security, and performance.

Hybrid Cloud

Here, Public and Private Clouds get deployed together in an overarching architecture. This one is applicable where a clear distinction between mission-critical operations and non-sensitive data is available. Although a bit expensive, these are effective in appropriate situations.

Entering The Stream of Cloud Deployment

By Location -
The Cloud software architecture deployment varies by location, wherein infrastructure and architecture shift closer towards the company when required. Location options render greater flexibility when serving end-users and leveraging Cloud software.

On-premise Cloud

This solution is used when Back End infrastructure gets deployed on company premises. Here, a centralised Cloud structure within a corporation gets created. It usually has limited scope for scalability.

Outsourced Cloud

This Cloud deployment takes place when physical hardware infrastructure gets managed by a third party. This aspect is primarily why their usage and demand exceed that of on-premise solutions. However, an Outsourced Cloud puts sensitive information in the hands of an unknown party, making it susceptible to breaches or Public Cloud access.

Wrapping It Up

The verdict is simple! Cloud computing is here to stay.

Cloud deployment makes the overall systems and mechanisms a whole lot easier by:

- Resolving latency issues and improving data processing requirements
- Providing easy access to data and digital tools
- Offering flexibility in scaling (up and down) Cloud resources
- Rendering state-of-the-art disaster recovery measures
- Automatically updating its service renderings
- Encouraging remote working

To deliver a Cloud architecture that holistically delivers these benefits, **Web Werks VMX** comprehensively provides computing, storage, virtualisation, and Network infrastructure. These aspects help with automated workload management across all mission-critical applications.

Web Werks VMX helps you instantly build and manage Hybrid multi-Clouds by supporting all workloads across Private and Public clouds, and hypervisors. It helps you avoid vendor lock-in with workload portability across Clouds and a single pane of glass for a seamlessly unified Cloud management experience.

To learn how Web Werks VMX can help your organisation in its Cloud migration journey.

visit **www.webwerksvmx.com** or call us on **+91 8097 522 490.**

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Reference Links:

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2. https://www.crn.com/news/cloud/enterprises-spend-178-billion-on-cloud-services-doubling-data-center-market