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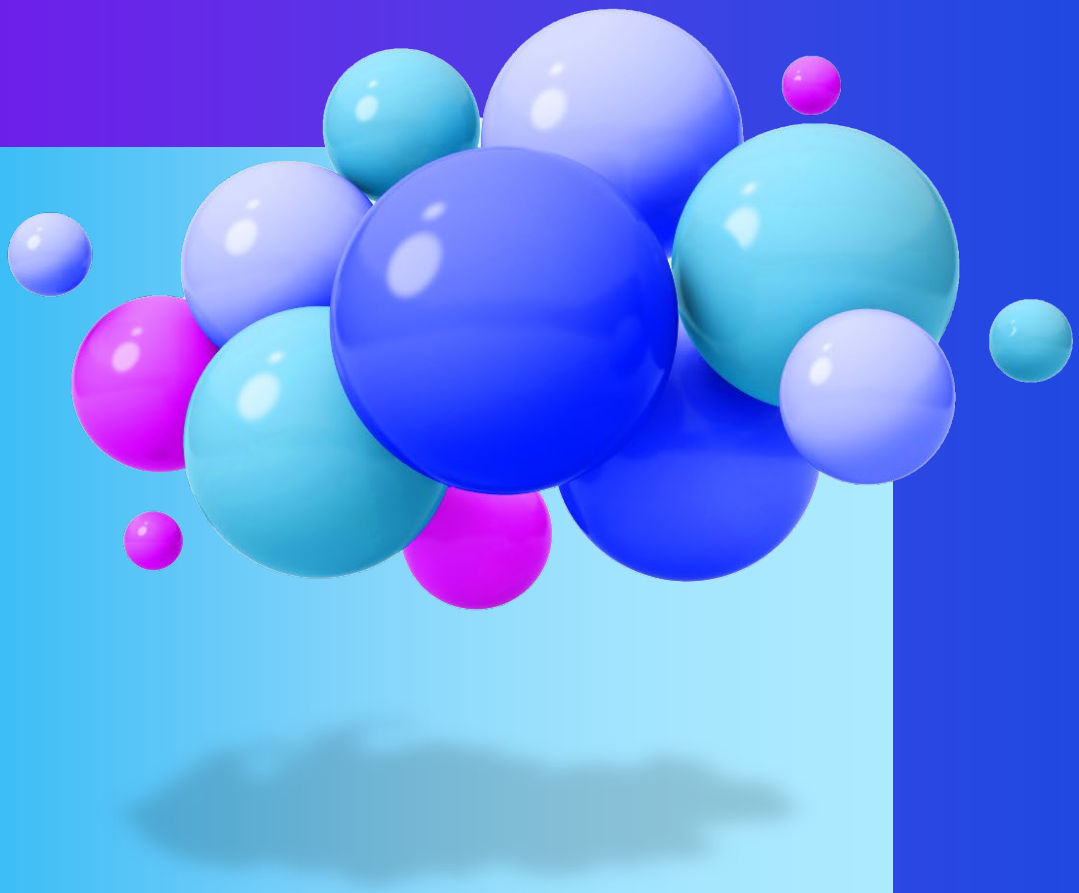

Cloud Native Computing

Delivering Business Value in the Cloud

Cloud Native Computing

01 CNC Definition

“Cloud native technologies empower organizations to build and run scalable applications in modern, dynamic environments such as public, private, and hybrid clouds. Containers, service meshes, microservices, immutable infrastructure, and declarative APIs exemplify this approach”. (Cloud Native Computing Foundation)

Cloud native computing is a method of building and running applications that are optimized for the cloud environment. In a cloud native approach, applications are designed to be scalable, resilient, and highly available, and they are typically built using microservices architecture and run in containers. This allows them to be easily deployed and managed in the cloud, and to take advantage of the many benefits of cloud computing, such as on-demand resource allocation and elastic scalability. Cloud native computing also emphasizes the use of automation and monitoring tools to ensure that applications are always running optimally and to facilitate rapid, continuous deployment. Overall, the goal of cloud native computing is to enable organizations to build and deploy modern, cloud-based applications that can meet the ever-changing needs of their internal and external users and customers.

Cloud native is an important part of the Cloud Migration Journey. In fact, there are two main different phases in the Cloud adoption approach. The first is the traditional “lift and shift”, the Re-host that involves simply relocating applications from an on-premises environment to the cloud with no, or limited modifications. The second, and more ambitious but with greater benefit approach, is refactoring or re-engineering, a way to modernize applications to embrace the Cloud Native Computing architecture design and its full benefits.

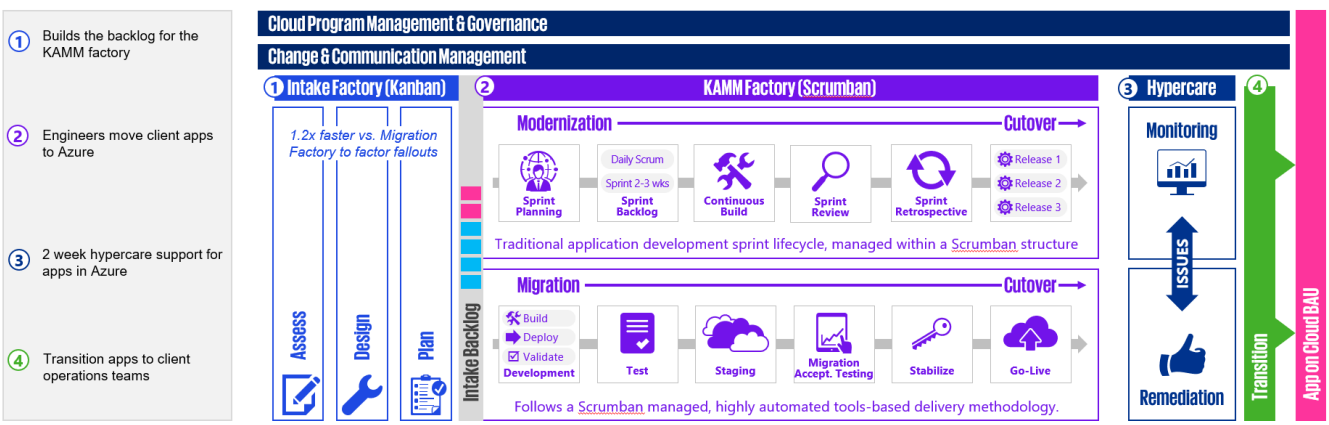

Figure 1 KAMM - KPMG Application Modernisation and Migration Factory

Cloud migrations has helped organisations to enhance overall customer experience, customer satisfaction indicators, improve internal processes, optimising costs and provide flexible working environments to their employees and partners.

To harness the real power of cloud, be it public, private, or hybrid cloud environments, Cloud native technologies have been embraced across organisations of various scales, to build and run scalable applications in these modern, dynamic, and distributed environments. Cloud native is a vendor agnostic approach, which has now become the new normal to build modern day applications using techniques like containers, service meshes, microservices, immutable infrastructure, and declarative APIs.

According to industry research firm Analysis Mason, cloud native functions will make up about 40 percent of the total addressable mobile network cloud market by 2025.

By 2025, Gartner estimates that more than 95% of new digital workloads will be deployed on cloud native platforms, up from 30% in 2021.

The demand for the cloud computing delivery model did gain traction even before the COVID-19 pandemic, but the demand grew manifold in the pandemic's wake. The global cloud computing market is expected to grow at a CAGR of 17.5% annually till 2025. As a result, it will trigger the market value from $371.4 Billion in 2020 to $832.1 Billion in 2025.

IDC, predicts that companies will broadly leverage cloud native practices to develop and deploy over 500 million digital apps and software services in the next two years.

Cloud native development practices are considered the best for maximizing the benefits of the cloud computing delivery model. It has been estimated that, from 2021 to 2027, the need for cloud native application development services will grow at the highest CAGR in the Asia-Pacific region. However, North America is expected to hold first place in the total market share, and Europe is anticipated to drive
second place.

Cloud native application practices enable businesses across industries, including banking, finance, manufacturing, healthcare, and more, to fill the gap created by the pandemic and ensure business continuity in a secured, efficient, and cost-effective manner.

02 Related technologies

The term CNC encompasses various tools, techniques and processes used by software developers today to build applications for the public cloud, as opposed to traditional architectures suited to an on-premises data centre.

The “CNCF Landscape” picture below is an interactive, comprehensive “image map,” which attempts to cover all of the active and emerging cloud-native technologies. The goal of the cloud native landscape is to compile and organize all cloud native open-source projects and proprietary products into categories, providing an overview of the current ecosystem

Today, the Landscape provides the world with the most up-to-date information about the top cloud native technologies, and it continues to evolve every hour.

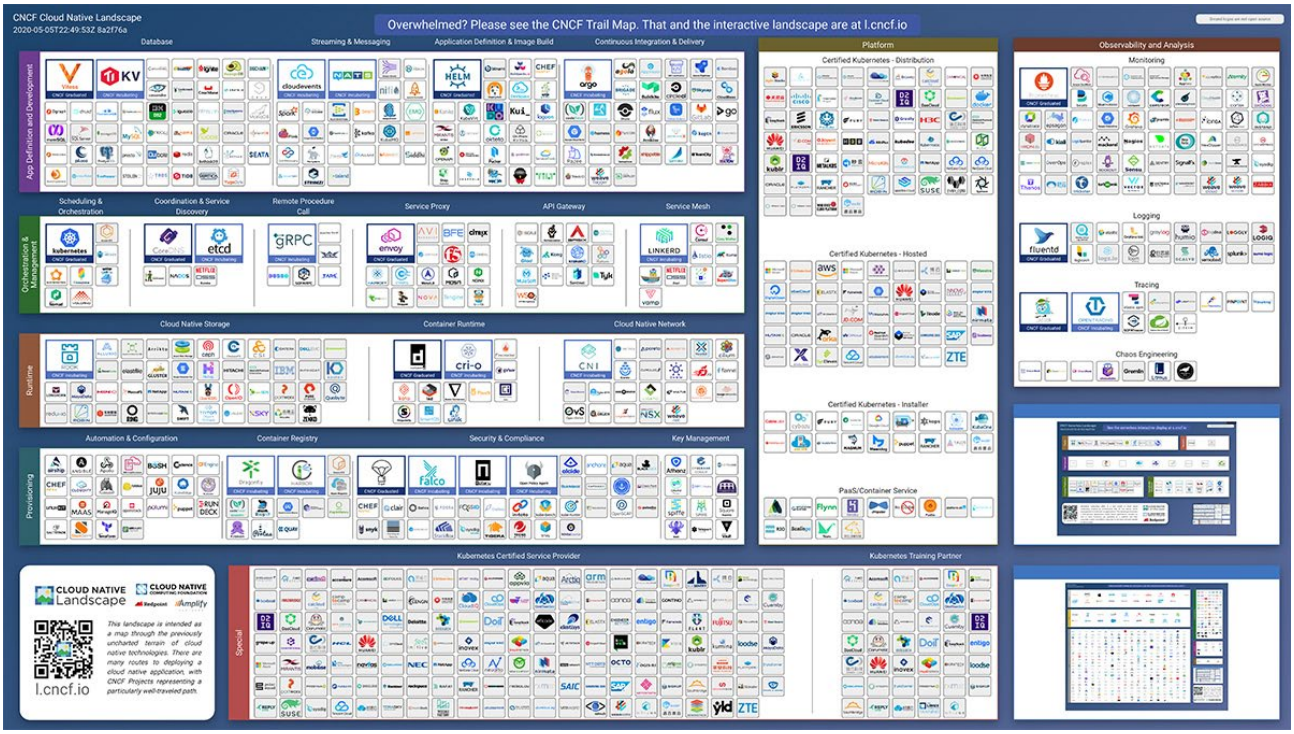

Figure 2 Cloud Native Landscape

The key technologies and methodologies that are commonly used in cloud native computing include:

Microservices architecture:

In a cloud native environment, applications are typically built using microservices architecture, which involves breaking an application down into small, independent, and modular components that can be developed and deployed independently. This allows for faster development and deployment and makes it easier to scale and manage applications in the cloud.

Containers:

Containers are a lightweight, portable, and isolated form of virtualization that allows applications to be easily packaged and deployed in the cloud. Containers allow applications to be run consistently across different environments, making them well-suited for cloud native environments.

Infrastructure as code:

Infrastructure as code (IaC) involves using configuration files and automation tools to define and manage the infrastructure needed to run applications in the cloud. This allows organizations to deploy and manage their cloud infrastructure, and to make changes to it in a consistent and repeatable manner easily and quickly.

Automation and monitoring tools:

Automation and monitoring tools are essential for managing and maintaining cloud native environments. These tools can automate common tasks and processes, such as deployment and scaling, and can provide real-time monitoring and alerts to help ensure that applications are running optimally.

Orchestration:

Kubernetes is the leading product in the market that manage containers. Main tasks are scheduling and provisioning containers instances, failover, scaling managing a network overlay for containers communication, and service discovery.

DevOps:

To reduce time to market, enhance customer satisfaction and reducing toil most organisations are making use of DevOps principles and practices such as Continuous Integration and Continuous Delivery, emphasis on communication and collaboration, streamlining processes and cultural changes.

Serverless computing:

Serverless computing allows organizations to run their applications without having to manage any underlying infrastructure. Instead, the cloud provider automatically allocates and manages the necessary resources to run the application, and the organization only pays for the resources that are used. This can make it easier to scale and manage applications in the cloud. FaaS is a way to implement serverless computing where developers write business logic that is then executed in Linux containers fully managed by a platform.

03 Benefits of adopting Cloud Native solutions

There are several benefits of adopting cloud native computing and the key ones are highlighted below:

Faster Time to market:

The Cloud native development process allow more speed and innovation to respond to mutable and increasing business requests in a fast-paced changing environment. This helps organisation to establish and sustain competitive advantage in their respective domains. Considering their distributed and loose independent nature, cloud native applications can be easier to improve as iterative and incremental sprints occur using more modern approaches and technologies as Agile and DevOps processes. Moreover, improvements can be made in segregation and with low impact and disruption to end-user experience resulting in a final better-quality product.

Cost optimisation:

Costs can be tailored and more easily adjusted to traffic peaks and requests so that the right amount of resources is available at the right moment giving a more granular control and finally a substantial cost reduction and optimisation.

Ease of Scaling businesses:

The up and down scalability is easier to implement due to the nature of the distributed architecture and the supporting infrastructure. With technologies like containers, microservices businesses can now scale at will and can also expand in diverse geographies without much effort, again leading to competitive advantages.

Better fault tolerance and availability:

With modern cloud native it's easier to build applications to be fault tolerant with resiliency and self-healing built-in. Because of this design, even when failures happen, it's easier to isolate the impact of the incident, and reduce the business disruption. Ultimately, cloud native microservices help to achieve higher uptime.

Improved operational processes:

Cloud native computing can significantly improve the operational processes by reducing toils and human mistakes thorough technologies like Infrastructure as Code. With IaC reusability and reliability aspects are added to technological processes.

04

Challenges of adopting Cloud Native approach

Though there are many benefits to business by adopting cloud native technologies and processes there can be some challenges that organizations may face at various steps when preparing for and adopting cloud native computing.

Learning modern technologies and development practices:

Cloud native computing often involves using modern technologies and development practices that may be unfamiliar to many organizations and their teams. This can require significant training and expertise to implement successfully.

Overcoming legacy systems and processes:

Cloud native computing allow for fast development and deployment, but they also demand a change in business culture. Many organizations have existing systems and processes in place that are not designed for cloud native environments. This can make it difficult to transition to a cloud native approach and may require significant re-engineering and restructuring of existing systems and operating model.

Managing complex, distributed systems:

Cloud native applications are typically built using microservices architecture, which can result in complex, distributed systems that are difficult to manage and maintain. This can require specialized tools and expertise to ensure that the system is running optimally and to quickly diagnose and resolve any issues that may arise.

Ensuring security and compliance:

Since with microservices there are many moving parts hence an increased blast radius from security perspective, it is quintessential to have security ingrained in each phase of SDLC. It is therefore recommended to apply principles such as security-by-design and DevSecOps practices.

Lock-in risk:

While cloud native applications can be designed to be vendor-neutral by using open APIs and technologies, this is not always the case. Applications that have been localized for one cloud platform cannot be easily ported to another cloud platform. This involves a large amount of rewriting the software and refactoring the code,

KPMG and CNC

KPMG has a leading role in supporting our customers in their journey to the cloud, in the transitional phase of rehosting and the transformational approach of modernizing monoliths and legacy systems.

Our capabilities can cover Cloud Strategy, Solution and Technical Architecture, Engineering, DevSecOps practices with years of experience in delivering successful modernisation projects to multinational and government organizations.

We have developed accelerators and frameworks such as KAMM, KPMG Application Modernisation and Migration Factory, Legacy Tool Kit to understand, measure and achieve a degree of visibility over the level of obsolescence that exists across the Technology estate and TIM, Transformational Impact Modeller for migration/modernisation costs analysis and optimisation.

Want to find out more? Contact Neeraj Sharma, Rashid Mohammad and Davide Gorini

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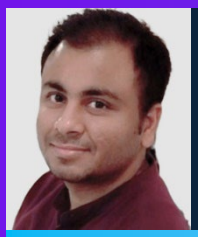

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