


# Integrating Cloud and Virtualisation into BCA Curriculums in India

Integrating cloud infrastructure management and virtualisation into Bachelor of Computer Applications (BCA) curriculums is vital. With the rise of cloud computing, students must gain practical skills in services like SaaS, PaaS, and IaaS.

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As India's IT landscape rapidly evolves, integrating cloud infrastructure management and virtualisation into Bachelor of Computer Applications (BCA) curricula has become critical. The rise of cloud computing and virtualisation is transforming how organisations manage their IT resources, making these technologies essential for modern business operations.

Along with Infrastructure as a Service (IaaS), it is important to also include Platform as a Service (PaaS), Software as a Service (SaaS), and the emerging Everything as a Service (XaaS) in this context. In SaaS, examples like Netflix, social media platforms, and e-commerce websites illustrate how these services operate.

Their tech stacks often leverage cloud-native architectures that utilise microservices, containerisation, and orchestration for building and managing applications. In a nation where digital transformation is accelerating, equipping students with cloud and virtualisation expertise is essential to creating a future-ready workforce capable of meeting the growing demands of the IT sector.

## The Growing Importance of Cloud Infrastructure and Virtualisation

Cloud computing and virtualisation lie at the core of today's IT environments, both globally and in India. Cloud infrastructure management involves the efficient operation of resources like servers, storage, and networking, while virtualisation creates virtual versions of physical resources, enabling more efficient and flexible usage.

These technologies offer significant business advantages, including enhanced scalability, cost reduction, and operational agility—benefits that are driving their rapid adoption across industries and making them essential learning areas for students in India.

The global cloud computing market is expected to reach \$1.2 trillion by 2027, with a compound annual growth rate (CAGR) of 17.9% between 2020 and 2027. In India, the adoption of cloud solutions is expected to grow at a similar rate, driven by factors such as government initiatives (like Digital India), increased demand for scalable solutions, and the rise of remote work capabilities post-pandemic.

With 82% of Indian companies planning to increase cloud usage, the demand for IT professionals skilled in managing cloud resources and virtualised environments has never been higher.

## Cloud Infrastructure and Virtualisation in India

India's digital transformation has accelerated the demand for cloud and virtualisation solutions across various sectors such as finance, healthcare, and education. Organisations are adopting cloud technologies to automate workflows, enhance service delivery, and reduce infrastructure costs. Virtualisation, in particular, has revolutionised IT resource management by allowing multiple virtual environments to run on a single physical server, optimising resource use while maintaining flexibility.

Together, these innovations are reshaping industries and setting the stage for more efficient operations across the board.

According to NASSCOM, India's public cloud market is expected to grow from \$4.4 billion in 2021 to \$13.5 billion by 2026, largely due to the increased adoption of SaaS, PaaS, and IaaS solutions. Gartner's Top Strategic Technology Trends for 2024 highlight the significance of cloud-native technologies, AI-driven automation, and edge computing as key drivers of this growth.

Virtualisation software such as VMware, Hyper-V, KVM, QEMU, and VirtualBox is becoming increasingly popular in Indian IT setups, allowing businesses to enhance flexibility and improve disaster recovery processes. As these technologies evolve, they are increasingly featured in BCA curricula, ensuring that graduates are prepared for the dynamic demands of the industry.

## The Role of BCA Programs in Bridging the Skills Gap

With businesses increasingly moving their infrastructure to the cloud, there is an urgent demand for professionals skilled in cloud computing and virtualisation. The Global Knowledge 2022 IT Skills and Salary Report highlights that IT professionals with cloud expertise earn significantly higher salaries compared to those without these skills, with cloud specialists earning an average of \$120,000 annually globally.

In India, cloud professionals see similarly strong compensation trends, with junior roles earning between INR 6-8 lakh per year and senior cloud architects earning upwards of INR 20 lakh. This growing wage disparity underscores the need for BCA programmes to focus on building cloud and virtualisation expertise.

However, despite this demand, there is a shortage of cloud and virtualisation talent in the country. A study by NASSCOM reveals that 70% of Indian businesses struggle to find talent with advanced cloud skills. This gap underscores the need for educational institutions to prioritise cloud infrastructure management and virtualisation as part of BCA curricula.

## Integrating Practical Skills into BCA Curriculums

To meet the needs of the IT job market, BCA programmes must offer hands-on experience with major cloud platforms and virtualisation tools. By including practical labs and projects with platforms such as Amazon Web Services (AWS), Microsoft Azure, and Google Cloud Platform (GCP), students can gain valuable experience that prepares them for real-world challenges.

Additionally, virtualisation software such as VMware, Hyper-V, KVM, QEMU, and VirtualBox should also be integrated into coursework to provide students with a comprehensive understanding of how to create and manage virtualised environments. Moreover, incorporating Cloud Application Development into the curriculum is crucial for equipping students with the skills necessary to design and deploy applications in the cloud.

## The Broader Context: Cloud and Virtualisation in India's Digital Future

The integration of cloud and virtualisation technologies is vital to India's broader digital transformation. Cloud solutions support scalable, cost-efficient infrastructures for businesses, governments, and startups alike. From smart city projects to e-governance, cloud computing is central to the country's push towards digitalisation.

Incorporating cloud and virtualisation into BCA curricula aligns with India's push for a more digitally skilled workforce. A report by Ernst & Young forecasts that by 2030, 50% of the Indian workforce will need to be digitally skilled in areas such as cloud computing, AI, and cybersecurity.

## Conclusion: Preparing India's IT Workforce for the Future

As cloud infrastructure management and virtualisation become indispensable in today's IT landscape, their integration into BCA curricula is essential. By providing students with practical skills, industry-relevant knowledge, and an understanding of the broader context of digital transformation, educational institutions can equip graduates with the expertise needed to excel in cloud and virtualisation roles.

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