



I D C M A R K E T S P O T L I G H T

Cloud Driving Big Changes in IT Organization Skills

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Adapted from *IDC FutureScape: Worldwide Cloud 2016 Predictions — Mastering the Raw Material of Digital Transformation* by Robert P. Mahowald, et al., IDC #259840

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3rd Platform disruption — cloud, mobility, big data/analytics, and social business — is causing most businesses to transform. While IT organizations have worked hard over the years to learn how to cope with change, the current rate of acceleration and the order-of-magnitude increases in every measure of volume present the CIO with a seemingly impossible challenge. Key trends in cloud computing are illustrative of the changing nature of the skills needed in an IT organization.

High Demand for Next-Generation Business/IT Skills, But Scarce Supply

The ability of IT organizations to develop competency in the 3rd Platform is constrained by a talent pool that is growing too slowly to meet business demand and too concentrated geographically for many enterprises to access. In 2013, IDC surveyed CIOs about the skills they'd need to support enterprise strategies until 2018. The talent that was identified as most urgently needed included expertise in business intelligence, analytics, mobile and social development, security, and business analysis. Not surprisingly, these are the skills necessary to drive digital transformation and the rapid move to cloud-based computing and include roles unique to cloud environments such as cloud administrators as well as IT security architects and IT generalists.

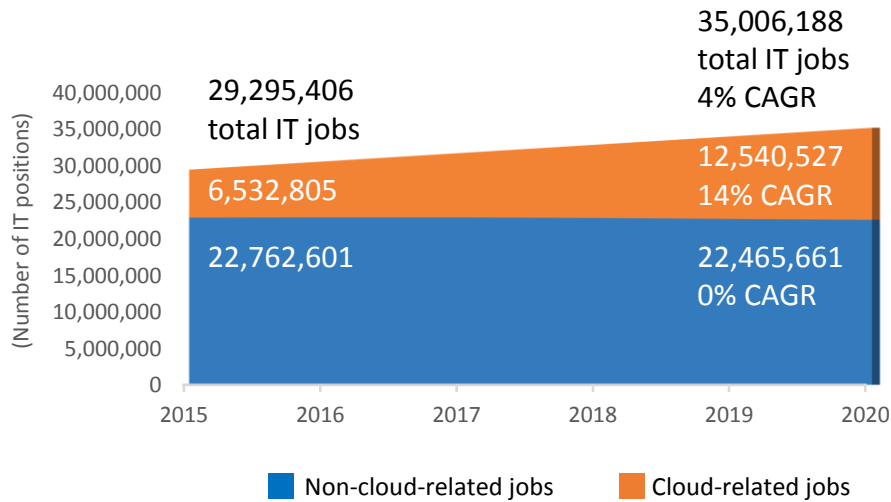
CIOs and other technology leaders have found these critical skills to be in short supply, particularly when their business is not close to major cities. As a result, there has been a trend to rely more on cloud-based service providers to substitute for this scarce talent. But the shift to cloud is also impacting the skills the IT organization needs. IDC believes that the availability and skill level of talent have a direct impact on functions as diverse as IT security analysts, cloud brokers, and cloud system engineers. While IT employment worldwide will grow about 4% every year from 2015 to 2020, all of that growth will occur in cloud-related positions. By 2020, more than one in three IT positions will be cloud related (see Figure 1).

The search for talent is shaped and constrained by the way businesses and IT organizations accomplish work. In the long run, the optimization of the slow-growth labor pool argues for cloud computing, and cloud computing requires a change in skills. Because talent cannot be easily hired, enterprises and IT professionals will need to consider the impact of IT trends and focus on developing skills that will be important in the near future.

IDC's predictions related to hybrid cloud, workload-centric management, and DevOps illustrate the changing skills associated with traditional IT roles and the challenges and opportunities faced by CIOs and IT professionals.

FIGURE 1

Worldwide Cloud-Related and Non-Cloud-Related IT Jobs, 2015-2020



Source: IDC's Cloud Skill Demand Model, 2016

Hybrid Clouds Ascending

More than 80% of Enterprise IT Organizations Will Commit to Hybrid Cloud Architectures by 2017, Vastly Driving the Rate and Pace of Change in IT Organizations

Over 80% of enterprise IT organizations will commit to hybrid cloud architectures encompassing multiple public cloud services, as well as private clouds, community clouds, hosted clouds, and/or noncloud infrastructure resources, by the end of 2017. More than 60% of enterprise-class businesses will subscribe to more than 10 different public cloud services by 2017. 25% of public cloud services offered in 2015 will no longer be available in 2017. The availability of this spectrum of choice, and the uncertainty of an operable, dependable system of suppliers and capabilities, presents an enormous management challenge.

The complexity of hybrid cloud environments is expanding to encompass a broad variety of legacy and cloud-native applications, open source infrastructure such as OpenStack, open API-based integrations, mobile and social human interactions, and software-defined and hyperconverged infrastructure. This is causing IT decision makers to put a premium on processes and tools that can simplify operations, maintain end-to-end service levels, and ensure that resources adapt seamlessly to dynamic changes in workload, processing, storage, and network requirements. Cloud services become increasingly attractive options for dealing with unpredictable resource demands and providing rapid access to advanced big data and development tools.

The performance and security requirements of individual applications, along with concerns about data sovereignty and regulatory compliance, will dictate which applications are deployed into public and private infrastructure-as-a-service (IaaS) environments and which are shifted to software as a service (SaaS). Cloud architects and cloud network and system engineers will develop and implement information architectures that promote data sharing across multiple clouds as well as risk management strategies to protect corporate interests if public cloud services fail or experience data breaches. The broad-based industry adoption of OpenStack APIs and open source container management technologies such as Docker makes multicloud integration and workload portability feasible. The goal is for an overarching management regime that allows automated, policy-based access to all required IT resources, whether at a provider site or in the corporate datacenter.

IT Impact

- Virtually all enterprise IT organizations will be expected to manage the delivery of consistent end-user experience SLAs and compliance with regulatory and corporate information management requirements and vendor risk management best practices as hybrid cloud architectures become more complex and dynamic.
- The majority of enterprise IT teams will need to gain up-to-date insight into the state of critical cloud-related open source standards and be able to evaluate how to best take advantage of these technologies across hybrid architectures during 2016.
- More than half of enterprise IT teams will need to create new cloud management roles by the end of 2016, including cloud architects responsible for building agility into business and IT processes and services; cloud database administrators responsible for cloud data migration as well as database application analysis and optimization; and cloud network and system engineers responsible for implementation and integration of cloud technologies.

Evolving IT Skills Related to Hybrid Cloud

Hybrid clouds will change and reprioritize some of the skills required in the IT organization. The IT organization will need to be able to design and orchestrate a full stack of services to support a rapid time to value for new applications and services. It will need to provision infrastructure and multitiered platform and application services across the enterprise service ecosystem. The skilled organization will be able to plan, build, and operate cloud services to reduce management complexity and lower operating costs. This will ultimately reduce risk, increase compliance, and deliver business value.

A diverse set of traditional roles will evolve, including system and network administrators, architects, security analysts, and even database administrators. For instance, cloud architects will need broad skills in infrastructure design and optimization and deep security and privacy capabilities. Cloud security analysts and architects will need increased capability related to data management, cloud infrastructure, and infrastructure integration. Even cloud administrators will evolve and need not only data management and integration skills but also contract and vendor management capabilities.

Workload-Centric Management

By 2017, More than 60% of Enterprise IT Organizations Building Hybrid Clouds Will Purchase New or Updated Workload-Centric Cloud Management Solutions

As the percentage of enterprise workloads deployed into production of public, private, and hybrid clouds increases rapidly, management software and operational priorities move beyond the deployment of simple self-service infrastructure provisioning portals to promoting investment in end-to-end application performance management (APM) and availability management, capacity optimization, and IT operations analytics tools.

Seamless workload portability and automated migration, facilitated by OpenStack and container technologies, will allow IT teams to quickly shift workloads in the event of infrastructure failures or performance bottlenecks. This increases the need for workload-aware management solutions that can monitor, model, and predict performance and maintain SLAs using automation and orchestration to scale, migrate, patch, and update applications as needed.

Simultaneously, IT organizations will move to implement unified hybrid cloud service management platforms that link application performance monitoring, IT operations analytics, and infrastructure control systems to business impact dashboards and policy-based orchestration engines. These will drive both end-user self-service access to the full range of IT services and resources and runtime workload optimization based on machine-to-machine interactions and changes in demand. Customers will demand tools that can optimize and orchestrate application performance regardless of whether the application runs in-house, on dedicated hosted assets, or in a public cloud.

Workload-centric management software and SaaS solutions will be adopted nearly twice as fast as traditional systems management tools. This accelerates the shift to emphasize the value of APM, IT operations analytics, cloud services catalogs, cloud service broker platforms, capacity optimization, and cloud business service management tools, along with integrated, standards-based automation and orchestration solutions.

IT Impact

- Effective management of hybrid cloud architectures requires clearly defined IT service definitions and policies, including standard configurations, SLAs, security, and governance, to ensure consistent service delivery and service levels regardless of the infrastructure resources supporting the workload. More than 60% of enterprise IT organizations that are implementing hybrid cloud strategies will begin to create standard service definitions, policies, and SLAs by the end of 2017.
- Unified application, middleware, and infrastructure automation and orchestration solutions are critical to supporting rapid, cost-effective workload provisioning, migration, patching, and life-cycle management. More than 60% of enterprise IT organizations that are implementing hybrid cloud strategies will need to purchase new or updated automation and orchestration software and/or services to enable their plans by the end of 2017.
- Unified service catalogs and cloud broker platforms that include service-level monitoring, service cost modeling, and capacity analytics will be needed to manage hybrid cloud environments in near real time. More than 50% of enterprise IT organizations that are implementing hybrid cloud strategies will invest in workload- and application-centric performance analytics and automation by 2017.

Evolving IT Skills Related to Workload-Centric Management

Workload-centric management will change and reprioritize some of the skills required in the IT organization. In a workload-centric organization, staff members would align with the workloads they serve. This will result in a multidisciplinary team for each workload. IT professionals in a workload-centric organization will need to understand application performance analytics and how to respond to changes in application performance. New orchestration and management tools will need to be deployed, changing the tools used by engineers and architects.

A range of traditional roles would evolve, including system administrators, network engineers, and system engineers. For instance, cloud administrators will need an increased understanding of system and database integration to anticipate impacts on performance as workload priorities are managed and adjusted. Network engineers and system engineers will increasingly rely on infrastructure integration capabilities, advanced networking skills, and infrastructure security to effectively design and upgrade service offerings.

DevOps Matures

By 2018, Over 60% of New Apps Will Use Cloud-Enabled Continuous Delivery and Cloud-Native Application Architectures to Enable Faster Innovation and Business Agility

Cloud-native applications are built using stateless, scale-out, distributed, microservice-based architectures that are optimized for public and/or private cloud infrastructure. They are often built using cloud-based development environments such as Cloud Foundry and OpenShift.

DevOps is a set of practices that unifies a team consisting of business leadership, development/testing, and IT operations to be responsible for the creation and delivery of business capabilities. It is often enabled by automated self-service tools for the configuration, provisioning, and life-cycle management of development infrastructure and platforms. The same automation templates and workflows can be applied to application release and production system control to ensure consistency between development and production datacenters. At its heart, DevOps represents a significant process transformation regarding how IT goes about its business of deploying and managing software and infrastructure, from inception to release and service management.

Together, DevOps methodologies and cloud-native architectures create an environment where applications can rapidly move from concept to production. Updates and new features can be published without impacting runtime performance, resulting in minimal downtime — which is critical in always-on digital businesses. Self-service cloud infrastructure and automated production release processes ensure that system and software configurations are consistent across the application life cycle.

The adaptive infrastructure offered by a cloud architecture and cloud services provides organizations with the ability to create virtual production environments and leverage service and network virtualization as part of the life-cycle process. This flexibility drives productivity for development, quality, and life-cycle management for deployment across 3rd Platform environments. Emerging combined development and life-cycle management options in the cloud also enable productivity for end-to-end deployment.

IT Impact

- Self-service provisioning and automation to support public cloud-, private cloud-, and hybrid cloud-based development teams will become required — not optional.
- Once DevOps is a working discipline, many change initiatives will be much easier to achieve. The IT organization will also be far more integrated into the business as a critical partner, which relies on DevOps strategies for multimodal software deployments across emerging platforms.
- IT is barraged with ideas about how to change itself. DevOps is a big idea. Any kind of transformation that is built around cultural change is fraught with risk. IT professionals with cloud-related skills and experience will be in a position to lead the change.

Evolving IT Skills Related to DevOps

DevOps management will change and reprioritize some of the skills required in the IT organization, and a wide range of organizational structures will support DevOps. Some firms have adopted a single "DevOps" organization, responsible for both development and operations, similar to the workload-centric structure described previously. Other organizations have simply improved the collaboration and coordination between the development and operations teams. And there are other variations, too. But in all cases, skill changes will be required in the IT organization to facilitate the objectives of this trend: Clearly, the cloud architect will need to understand both the development process and the

operations process in order to best design an architecture that facilitates coordinated activities. Similarly, both the cloud administrator and the cloud database administrator will need to enhance their skills to support increased participation in the development process, including identifying stakeholder requirements, development skills, and integration skills.

Essential Guidance and Conclusion

Cloud continues to be a highly disruptive force, reshaping datacenter and application architectures and transforming the way IT resources and applications are created, bought, and managed. Enterprise IT teams cannot ignore the challenges and opportunities created by cloud in its many shapes and forms.

Over the next 24 months, staffing for cloud services will become a strategic driver for the IT organization as new skills and capabilities become increasingly essential to effective IT development, deployment, and governance. These include both IT-heavy skills (such as using agile/DevOps approaches or new orchestration tools) and business-heavy skills (such as compliance or managing the consumption of cloud services in a hybrid cloud model).

IDC expects that over the next four years, there will be a 40% increase in developers skilled in model-driven and deployment-centric frameworks, and masters of iterative code testing. There will be a commensurate need for developers skilled in mobile and commercial code development, familiar with declarative code frameworks and integrated PaaS development and deployment. Over the same period, the population of pure IT operations staff will drop by about 10% in IT organizations as more compute and storage workloads and applications are moved to cloud. But the cloud will drive an increase in the demand for cloud architects, engineers, administrators, and analysts with the skills necessary to effectively build, deploy, and manage hybrid environments that are managed by workload-centric and DevOps-centric IT organizations.

IT professionals can position themselves to be part of this essential shift by identifying the needed skills and preparing themselves in advance to help lead their IT organization on the journey to become more agile, reduce cost, and improve business performance by leveraging hybrid cloud, workload-centric management, and DevOps.

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