Fortify These Five Essential Employee Skills Categories for Infrastructure-Led Innovation

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Initiatives: Infrastructure and Operations Leaders

Cloud and DevOps initiatives challenge infrastructure and operations professionals to reexamine and enhance their skill requirements. In order to lead innovation, I&O leaders must focus on five important skills areas.

Overview

Key Findings

- Infrastructure and operations roles and responsibilities continue evolving as the emphasis for these teams shifts from the installation and management of physical infrastructure to supporting the adoption and management of services.
- The pressure to deploy or to enhance effective digital business applications more quickly demands greater agility from I&O teams.
- I&O leaders cannot afford to let their team members remain static in their capabilities as skill requirements evolve or as they risk being deemed obsolescent.

Recommendations

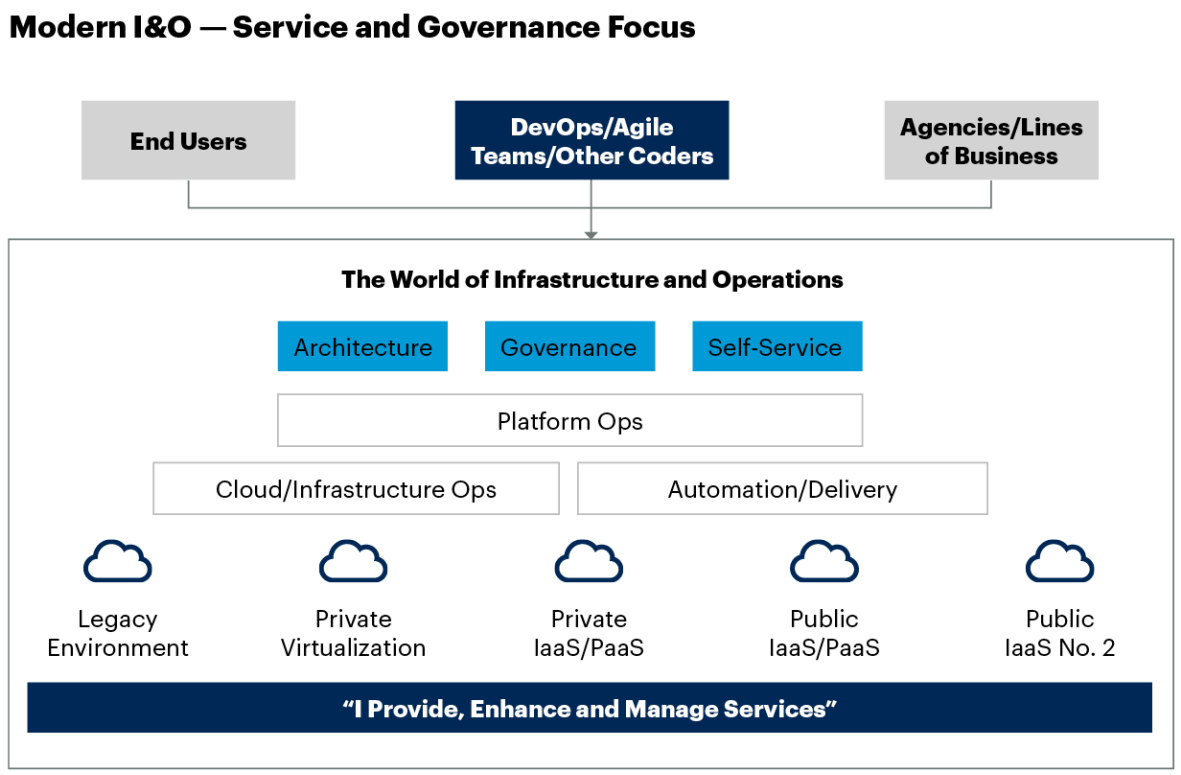
To achieve infrastructure-led innovation, I&O leaders must:

- Start enhancing the skills of their team members by focusing on five main categories noted in the body of this document.
- Develop and sustain infrastructure-led innovations by prioritizing specific capabilities under each of these five skills areas that align with their most important strategic initiatives.
- Implement the most effective method to enhance these skills categories and improve agility by using informal training, formal training and/or hiring to fill skills gaps.

Introduction

I&O no longer can focus solely on the traditional silos like compute, storage, network, security, database, applications and end user support. To lead innovation, I&O must adopt a more collaborative services and governance focus. We'll call this focus "Modern Infrastructure and Operations" (Figure 1).

Figure 1: Modern I&O — Service and Governance Focus



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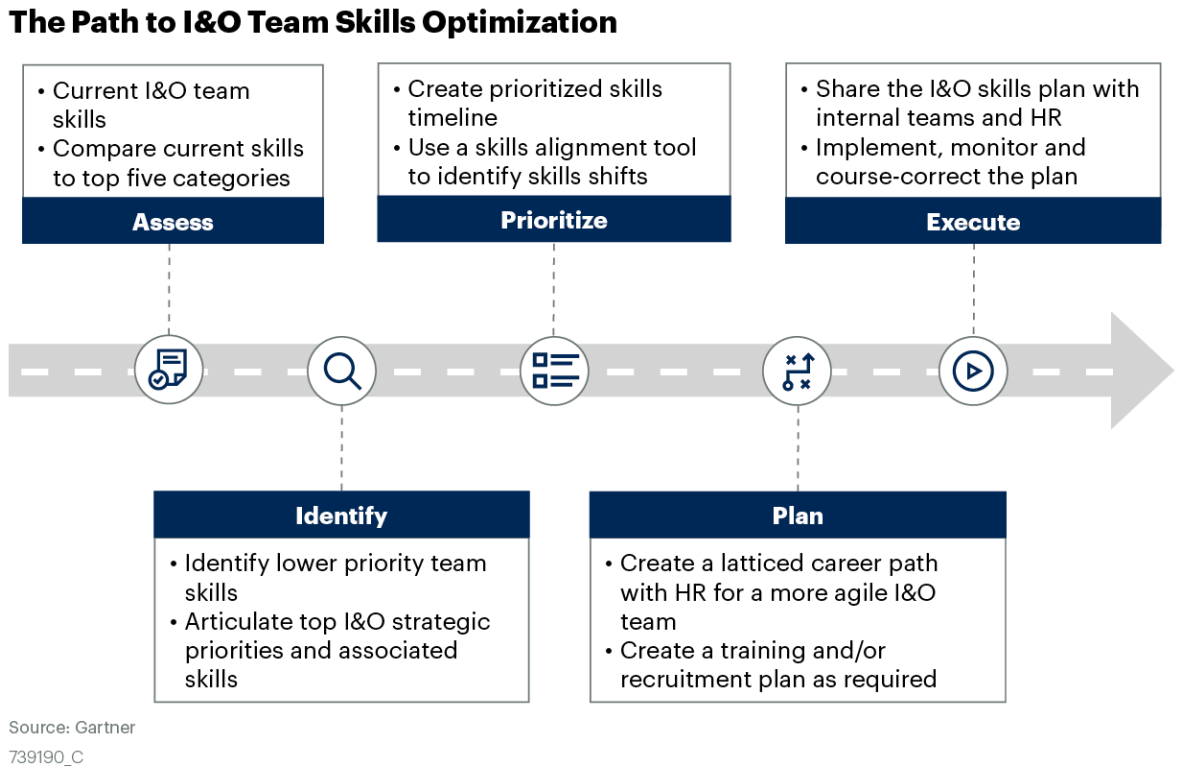
Analysis

There are five essential skills categories on which I&O must focus if they are to achieve infrastructure-led innovation. These categories are automation, cloud operations, monitoring, platform ops and service delivery (see Figure 2).

Figure 2: The Five Essential I&O Skills and Competency Categories

I&O leaders can use these categories as a foundation for shoring up the skills within their organizations. The ultimate goal should be achieving a level of skills optimization within the I&O team. The path to this skills optimization starts with a team assessment and leads to the development and execution of an effective plan (see Figure 3).

Figure 3: The Path to I&O Team Skills Optimization



Each of the five categories has associated capabilities that can be identified. Understanding each of these categories and their associated capabilities allows an I&O organization to see where skills and competency gaps exist within their organization. I&O leaders then can prioritize informal training, formal training and/or hiring as ways to fill those gaps.

1. Automation

Most organizations already have various degrees of automation skills in the I&O functional teams. Automation speeds up the execution of IT tasks and process workflows, reduces errors and configuration drift, and improves compliance and security. Automation makes processes repeatable, traceable and more reliable. Rather than treating automation as its own discipline, most organizations have historically practiced automation opportunistically. This status is changing with the emergence of specific automation roles in operations groups. Shoring up skills in this area helps create more opportunities for I&O teams to innovate.

When silo-based groups (e.g., server, storage, network, etc.) develop automation capabilities to address only their own needs, they produce islands of automation, rather than reusable reference architectures and processes. As new scenarios and use cases emerge, I&O organizations are better-served if they develop consistent approaches and toolsets across multiple environments. They can do this by treating automation as a platform that is architected and governed consistently across the organization.

Underlying specific skills that are needed within the automation skills category include:

- Developing automation scripts
- Configuration management
- Infrastructure as code (IaC)
- Testing and deploying automation processes
- Product build and release automation
- Cloud infrastructure and platform services (CIPS)
- Software development

Automation skills are still in a relatively early growth phase. This means that they may not be readily hired, but it also means that — because they are in demand, many team members will welcome training and development opportunities in these areas. In this case, the exploration of training is a good first step in gaining these skills for a team.

2. Cloud Operations

Almost all Gartner clients see an acceleration of cloud services adoption (see Market Trends: Cloud Shift — 2020 Through 2024). In addition, I&O is being required to support operations within multiple cloud environments. Multicloud operations and consistent governance are not simple to achieve, and many organizations that adopted cloud in an ad hoc fashion now concentrate on establishing a broader set of governance and best-practice architectures and processes across all cloud operations. Because different cloud providers approach networking, storage, security, identity, databases and management with different architectures and tools, the skills to operate cloud infrastructure successfully are not easy to acquire. This skills acquisition challenge is compounded by a highly competitive market for cloud-related skills.

Underlying specific skills capabilities within the cloud operations category include:

- Provisioning
- Security
- Networking
- Storage management
- Database management
- Identity and access management
- Native cloud management tools
- Third-party cloud management tools

3. Monitoring

Many organizations have multiple tools in place to monitor the health and performance of their infrastructure and application services. Modern applications and frameworks introduce the challenge of monitoring more distributed and dynamic systems. The world of hybrid IT, multicloud, containers and serverless infrastructure requires new approaches to monitoring — and often new tools. I&O leaders can drive innovation in the monitoring area by adopting these new approaches and tools.

Changes in product development processes introduce new types of users and interactions to the monitoring subsystem. The shift to agile product development and DevOps shared responsibility brings developers into scope and substantially changes the audience for monitoring, as well as the expectations for the tools themselves. Effective monitoring brings a data-driven, evidence-based approach to support appropriate change — which is crucial in getting organizations on board to make those changes.

Some I&O organizations are turning to artificial intelligence to enhance IT operations. AIOps tools combine big data analytics and machine learning functionality to observe, filter and act on information (see section #5 of this IT Resilience — 7 Tips for Improving Reliability, Tolerability and Disaster Recovery research for download of Five Monitoring Classifications).

Underlying specific skills capabilities within the monitoring category include:

- Application performance monitoring (APM)

- Digital experience monitoring (DEM)
- AIOps
- Metrics, KPIs and OKRs
- Capturing Logs
- Distributed tracing
- SLA and SLO management
- SRE

A variety of management tools have been a part of I&O responsibility for some time. Leveraging existing monitoring skills into other monitoring skills represents a quick path to acquire specific skills for an I&O team. Ensuring that training credits are a part of the adoption of any new monitoring tools can also help get existing team members training, when needed.

4. Platform Ops

Some organizations take an approach to scaling DevOps called “platform ops.” Platform ops relies on a new team that delivers products for the organization. Platform operations are distinguished from cloud infrastructure operations by focusing on environments that abstract away infrastructure details and operate “up the stack.” Platforms might operate across on-premises, colocation and hosted environments — as well as on cloud infrastructure — so platform operations and cloud operations are not always the same.

Platforms abstract the developer from the provisioning and management of underlying compute, network and storage resources. Cloud infrastructure is common for DevOps environments, and for this reason, platform operations often rely on cloud operations to provide the appropriate underlying infrastructure, services and tools. The platform team develops a platform that depends on operations that are often in different cloud environments — so individuals who operate platforms will, in all likelihood, need cloud skills as well. Even so, platform operations teams will rely on cloud specialists for specific help in areas such as performance, networking, storage, security, identity and provider details.

Members of the platform operations team will need to possess capabilities in the specific technology environments supported by their platform.

Underlying specific skills in the platform operations category include managing:

- A PaaS framework or cloud-native application platform
- fPaaS platforms (See Glossary)
- CaaS platforms (See Glossary)
- Container orchestrators
- VM orchestrators and CMPs
- An application release orchestration (ARO) platform
- A data processing pipeline
- Custom middleware
- Software engineering

Many platform ops approaches have required little support from I&O in the past. Where I&O now plays an important role is in the development of consistent architectural standards and support for performance, integration, identity and monitoring capabilities. This is the value that platform ops professionals provide and why these skills have become more essential to I&O innovation. Focus on training and hiring to enhance these related competencies to gain the needed skills in the platform ops areas.

5. Service Efficiency

IT organizations need to move away from merely providing technology offerings and move toward delivering and supporting an array of different services in a manner tied to business returns. This service-oriented IT model also requires I&O professionals to enable users and developers to access innovative capabilities (both internal to their organization and external) in a timely manner. This is critical, as the emergence of digital native organizations increases the competitive pressures on nondigital native organizations who may not be able to respond as quickly to market demands and achieve equivalent cost efficiencies in the process.

Today's competitive environment means that I&O professionals must also protect the interests of the business through expense management, security and governance. Traditional ITSM processes are viewed as an impediment to speed in the digital world, but bypassing controls can also increase risk. I&O professionals must add modern practices for areas like change management to accommodate new product development teams (see Building Product Management Teams in IT and Beyond, Part 1: Structure, Leadership and Roles).

A common way to provide the agility that product teams require is to give them some form of self-service access to the platforms and infrastructure capabilities built by the platform team. The central services can be treated as products, and user relationships and requirements gathering are important here as well. Although many of these skills might be considered "soft skills," a background in the underlying technologies is a huge advantage in helping developers and users best utilize platforms and cloud infrastructure to deliver solutions. Service delivery is the part of I&O that is closest to the business functions and may be seen as more valuable as a result.

Underlying specific skills in the service delivery category include:

- User needs/developer relations
- Service/product ownership
- Business acumen
- ITSM
- Automated incident response implementation
- Self-service portal creation
- Service desk management

Two approaches can help increase and improve these skills. The first is to add an element of business acumen to training offerings and recruitment efforts. The second is to offer lateral movement across domains as a means of career advancement. The combination of business elements and cross exposure to other I&O domains will help ensure that service efficiencies are improved and deliver increasing returns for the business.

Conclusions

To achieve infrastructure-led innovation, I&O professionals must adopt and enhance skills in five main categories. They are automation, cloud operations, monitoring, platform operations and service efficiency. Through the use of training and/or hiring, I&O teams can acquire the capabilities needed for these essential skills categories. As I&O groups strengthen their skills in these categories, they will find themselves in a better position to lead the innovation required in the ever-evolving digital world.

Evidence

Evidence for this publication was derived from a variety of sources, including over 500 client inquiries related to I&O skills requirements.

Acronym Key and Glossary Terms

fPaaS—functional platform as a service	An fPaaS provides a serverless execution environment for small, event-triggered functions. These platforms enable you to run code without provisioning or managing servers, and they automatically scale to support increasing or decreasing load. Examples of fPaaS offerings include Apache OpenWhisk, AWS Lambda, Google Cloud Functions, IBM Cloud Functions and Microsoft Azure Functions.
CaaS—container as a service	CaaS platforms come in two main types. Public cloud-based CaaS platforms depend on a public cloud provider for integration with their services, which are often proprietary. An application deployed within a public cloud CaaS platform typically can be difficult to port on-premises or into another cloud provider. Examples are Amazon Elastic Container Service (Amazon ECS), Azure Kubernetes Service (AKS) and Google Kubernetes Engine (GKE). Some organizations choose to implement a self-managed CaaS platform. A self-managed CaaS platform requires more engineering effort but can run on-premises, in a public IaaS or in both simultaneously. The self-managed CaaS platform can fully leverage the inherent portability of containers.

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