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Driving Innovation With Azure Infrastructure and DevTest Labs

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From aerospace to energy and healthcare to retail, business ecosystems across the globe are transforming into digital marketplaces. In this environment, buyers and sellers interact daily through social and mobile channels. And companies in every industry and geography must meet customers' high expectations for fast resolution and anywhere, anytime commerce.

To meet this demand, market leaders are rapidly deploying digital experience and analytics applications on flexible cloud platforms, such as Microsoft Azure. Software development, testing, and IT operations teams are using innovative tools to implement agile and DevOps methodologies. Security and compliance groups, likewise, leverage scalable, SaaS-based threat detection, single sign-on, and other risk avoidance solutions, to protect IP and customer data.

Underlying this digital transformation is an assortment of **infrastructure platforms** unlike the data center technologies supporting legacy applications. While still containing storage, compute, network, and security, these platforms are **paired with automated cloud management and service catalogs, collectively known as service-oriented infrastructure (SOI).**

SOI environments connect developers to the exact infrastructure resources required for a given application effort, precisely when they need them. Whether an IaaS, PaaS or SaaS platform, on a private, public, or hybrid cloud architecture, SOI delivers one-click access to complete **development environments** and managed services through a catalog of choices. This empowers engineers and speeds time-to-market.

In this scenario, IT Operations shifts from technology administrator to a broker of tools and resources accessed through a service catalog. And application developers assume more control of self-provisioned infrastructure and tools which lowers their dependency on systems administrators.

Reaching this desired state, however, requires a clear understanding of the starting point and destination, and how to guide the journey. This paper focuses on transforming from existing compute platforms to a cost-effective, SOI setting, like Azure infrastructure, DevTest Labs, and Service Catalogs, that speeds innovation, lowers time-to-market, and delivers competitive advantage.

Service-Oriented Infrastructure

Like plant operators firing up machinery, software engineers are indifferent to how their development systems are powered. In the plant, electricity may come from on-site generators and solar panels, or third-party wind and coal. For the developer, storage and compute could come from Microsoft Azure and Salesforce.com, or corporate mainframes and x86 servers. Both teams just want one-click service when needed.

SOI enables on-demand services for the software engineer from a combination of physical infrastructure, cloud management, and DevOps tools accessible from service catalogs. Tools, such as Jenkins continuous integration servers

> “Digital transformation occurs when you use digital technology to change the way you operate… and the way that value is created.[1]”
>
> *- Harvard Business Review*

[1] https://hbr.org/2016/07/7-questions-to-ask-before-your-next-digital-transformation

and Docker software containers, help developers and QA rapidly provision DevTest and application environments to any machine, without worrying about the infrastructure. With a single, consistent code base to provision cloud services and developer resources, DevTest environments remain consistent across all parts of the software lifecycle – design, code, build, test, and deploy.

This orchestrated and automated end-to-end provisioning with a single code base can be enabled by the Azure cloud and DevTest Labs, and Managed Applications Service Catalogs. In more manual provisioning models, system administrators write custom, error prone scripts for each pair of infrastructure and workstation. Frequently, an application that works on one developer's system, does not work on another's, and roll backs are required. Furthermore, provisioning can take days or weeks. Azure DevTest Labs and Managed Applications simplified environments, however, replace one-off scripts and version control issues with an efficient, automated process, and reduce provisioning times to hours or minutes.

In an SOI environment, the new stack of technologies includes:

- **Physical infrastructure**
  Compute, storage, and network capacity regardless of supplier, ownership, or location. I.e. – Azure cloud IaaS services.

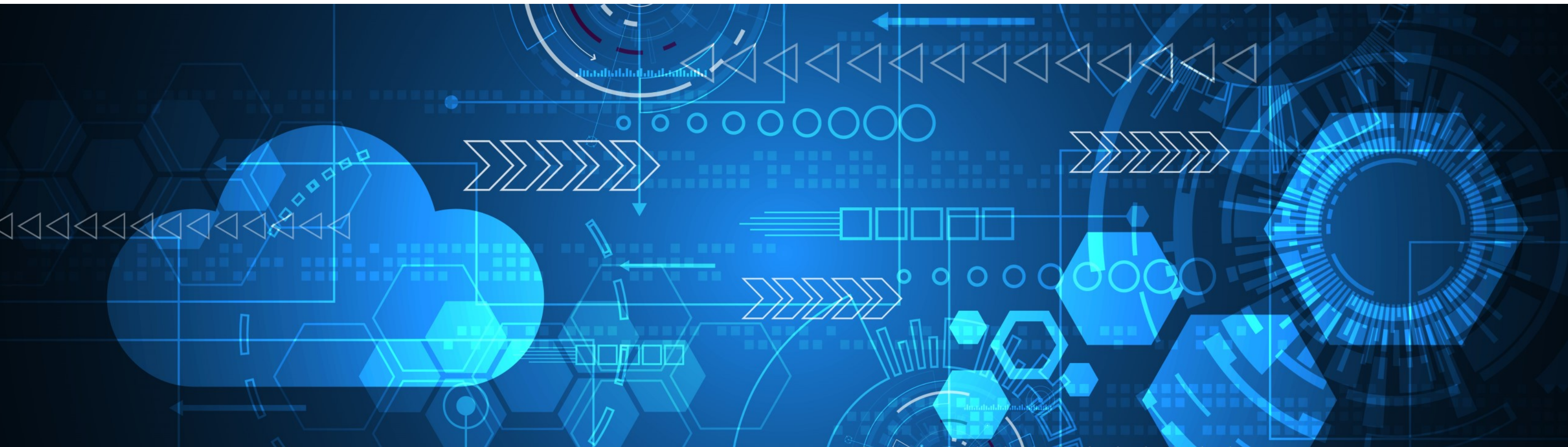
- **Software-defined infrastructure (optional but valued)**
  System architecture where compute, storage, and network functionality is defined by software, and decoupled and abstracted from the underlying physical infrastructure. Embedded in Azure cloud platform.

- **Cloud platform tools**
  Management tools that abstract provisioning from software-defined and physical infrastructure, and allow for quick deployment of system resources. I.e. - Azure Automation & Control within the Operations Management Suite, and Jenkins automation server.

- **DevOps tools**
  A toolchains, owned by IT Operations and consumed by Application Development, that automate every step of the software development lifecycle. I.e Docker, Chef, and Eclipse.

For each part of the SOI stack, an enterprise may own and run the technologies, outsource them to managed service and cloud providers, or choose a combination of the two. Whether owned or outsourced, however, IT Operations must procure and allocate these resources, and transition their responsibilities to that of a broker of services. Application Development teams, the consumer of services, also must shift roles to include self-provisioning and management of cloud resources they consume.

Converting existing infrastructure to an SOI environment can be done gradually, one application workload at a time. IT can integrate old infrastructure, including Windows and Linux servers, into a new private cloud architecture, or retire and replace it with alternative private or public cloud resources like Microsoft Azure.



Whichever the case, it's important to approach this transition to SOI strategically, with a cross-organization cloud strategy and execution plan, a strong business case, and senior management endorsement.

IT Operations as Service Orchestrators

The benefits of an SOI environment are substantial. Infrastructure management is automated and often outsourced. Expenses shift to pay-as-you-go while costs decrease. And application releases are rapid and more frequent. This combination improves agility, time-to-market, and business response to industry changes. In summary, SOI platforms enable rapid yet simplified digital transformation, and lay the foundation for organizations to innovate faster, speed deployments, and meet consumer needs.

To realize these benefits, however, IT Operations' role changes substantially from enterprise infrastructure experts to the delivery of DevTest resources in a cost effective and timely fashion. With SOI, operations teams can focus less on the complexities of technology, and more on defining cloud services and creating DevTest service catalogs. In short, IT Operations must evolve into service orchestrators.

In this new model, IT Operations and Application Development must work together as publishers and consumers of services respectively. Often the lines blur between the two groups. Thus, it's important to have strong leadership that can clearly define these roles and guide teams through cultural and functional changes.

In a SOI environment, IT Operations typically owns the following activities:

- **Procure and allocate cloud resources**
  Acquire cloud resources, such as Microsoft Azure, manage capacity, ensure connectivity, maintain commercial contracts.
- **Monitor cloud resources and connectivity**
  Develop and monitor metrics, ensure performance, scalability, and uptime, create dashboards.
- **Select and manage DevOps tools**
  Procure DevOps toolchain, add and upgrade to meet development team needs.
- **Maintain Security**
  Define and monitor access control, verify data -in-motion encryption, deliver threat and malware containment.
- **Verify governance, risk, and compliance (GRC)**
  Interface with GRC team to ensure IT operations meet corporate mandates.
- **Oversee policies and costs**
  Manage usage thresholds, alerts, expenses, and business unit chargebacks while providing adequate choice to developers and the enterprise.

Embedded in each item above, and an essential role of IT Operations, is to ensure the satisfaction of its internal customers – Application Development. This transition in roles and change in culture, is only accomplished with strong leadership across IT and the business. If done right, it enables the enterprise to remain competitive and deliver outstanding digital experiences to customers.

> “Workloads can be moved from one environment to another more effectively if all the hardware dependencies have been removed or can be managed using code.[2]”
>
> *— Computer Weekly*

[2] www.computerweekly.com/opinion/Infrastructure-as-code-What-does-it-mean-and-why-does-it-matter

Application Developers as Cloud Services Consumers

Cloud infrastructure, service catalogs, and DevOps toolchains provide significant automation which shifts many tasks, previously performed by IT Operations, to application development teams. With one-click, engineers can self-provision cloud infrastructure and development environments.

From the engineer's perspective, the demarcation between Application Development and IT Operations can also be unclear. One way to define the difference is DevTest tool publishers versus consumers. Once acquiring tools from IT Operations, developers code and manage the application lifecycle. DevTest tools critical for SOI environment success include the following :

Cloud Platform Management

A combination of tools or a complete DevTest sandbox, like the Azure DevTest Labs, that automate cloud provisioning and configuration management, and abstract infrastructure so engineers can focus on new capabilities. These tools and sandboxes maintain information on how systems inter-relate, can help decide which cloud platforms to consume, and orchestrate the movement between systems as needed. They also eliminate the need for scripts, and drive provisioning consistency at scale.

Continuous Integration Servers

Application developer solution that integrates with a range of other DevOps tools in the application delivery pipeline and then reviews, builds, and inspects code from multiple engineers as they submit new releases. CI servers, like Jenkins, allow developers to address potential issues early in the development lifecycle, and promote transparency as all team members have access to the feedback produced by CI Servers.

Software Containers

Platform tools for developers to build, ship, and run distributed Linux and Windows Server applications, whether on laptops, virtualized servers, or the cloud. Unlike VMs, containers do not bundle a full operating system, rather, only the required libraries and settings. Containers can run and manage applications side-by-side in isolated areas to achieve better compute density, and allow developers to rapidly ship new features with higher security and quality. Popular containers include Docker, Kubernetes, and Azure Container Service (AKS).

DevTest Service Catalogs and Sandbox

An interface for application developers to select from a curated collection of development tools and environments which promotes simple and consistent provisioning. DevTest catalogs and

> “IT organizations are evolving from merely delivering technology to brokering services from multiple external and internal sources.[3]
> — *CIO Magazine* ”

[3] www.cio.com/article/2908156/it-strategy/culture-clash-transitioning-it-into-a-service-broker-culture.html

sandboxes, such as Azure DevTest Labs, allow developers to review options and choose specific and repeatable services based on their needs. Furthermore, access control allows developers to view services only relevant to their role and department, which minimizes proliferation.

As stated above, enabling developers across the enterprise with service-oriented cloud infrastructure demands a strong understanding of technology components and shift in roles. Achieving SOI requires a strategy and execution roadmap that assesses existing infrastructure and applications, and specifies which ones to replace, migrate, and extend. Strategy and execution plans then provide a blueprint of steps to follow or share with experts. Ultimately, turning strategy into an SOI reality requires drawing on internal and external expertise.

How Trianz Can Help

Trianz is a Microsoft Gold Partner and Managed Services Provider for Azure. Our experienced professionals maintain numerous Azure Certifications across all critical aspects of Microsoft cloud services.

As a strategic managed services partner, Trianz offers a customized Azure migration roadmap to achieve service-oriented infrastructure and service catalogs. Our Certified consultants use proprietary tools and templates to discover, assess, analyze, and recommend execution plans for the cloud journey. Our experts enable reference architectures for Azure IaaS, PaaS, and SaaS platforms with a focus on execution success.

We deploy Azure-based hybrid environments by incorporating automation at every possible opportunity and seamless orchestration of workloads across on premise and cloud platforms. Trianz collaborates with clients to monitor Azure performance and align infrastructure to meet ongoing business needs. A key Azure advantage is agility and innovation. Trianz helps open the possibility for business leaders to test new ideas on Azure, accessing the secure infrastructure without the need for large upfront capital investment.

Based on Trianz' research and experience with Azure, the following expert guidance helps clients better manage their migration to Azure.

- **Define governance framework**
  Enables oversight of adopted cloud systems and ensures highest post-migration value.
- **Migrate well-suited workloads**
  Avoids unnecessary complexity of apps with poor Azure compatibility.
- **Automate testing and bug fix**
  Saves cost and time to complete integration evaluation.
- **IP and solution driven approach**
  Adopt Trianz' proven domain templates, tools, and capabilities that help clients smoothly migrate to Azure services.

ABOUT TRIANZ

Trianz simplifies digital evolutions through effective strategies and excellence in execution. Collaborating with business and technology leaders, we help formulate and execute operational strategies to achieve intended outcomes by bringing the best of consulting, technology experiences, and execution models. Powered by knowledge, research and perspectives, we serve Fortune 1000 and emerging organizations across industries and geographies to transform their business ecosystems and achieve superior performance by leveraging Cloud, Analytics, Digital, Infrastructure and Security paradigms.

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