



DIGITAL  
EVOLUTION  
SIMPLIFIED™

A photograph of two men in business suits standing in front of a modern building with large glass windows. The man on the left is older with grey hair, and the man on the right is younger with brown hair. They are both gesturing with their hands as if in conversation. The man on the right is holding a black briefcase.

Driving Innovation and Speed  
With Service-Oriented  
Cloud Infrastructure

CLOUD • ANALYTICS • DIGITAL • INFRASTRUCTURE • SECURITY

## Service-Oriented Infrastructure: Foundation for Cloud Platform

*One-click Access to Application Development Resources*

### Cloud Infrastructure and Service Catalogs

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. 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 application development service catalogs that empower engineers and speed time-to-market. This combination of cloud platforms and service catalogs is called service-oriented infrastructure (SOI).

SOI environments connect developers to the exact resources needed for a given application effort, precisely when they need it. Whether an IaaS, PaaS or SaaS platform, on a private, public, or hybrid cloud architecture, SOI delivers one-click access to complete development environments through a catalog of choices. In this scenario, the IT Operations group's role shifts from technology administrator to a broker of tools and resources. And application developers assume more control of automated infrastructure 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 that speeds innovation, lowers time-to-market, and delivers competitive advantage.

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



<sup>1</sup> <https://hbr.org/2016/07/7-questions-to-ask-before-your-next-digital-transformation>

## 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 AWS 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. Tools, such as Jenkins continuous integration servers and Docker software containers, help developers and QA rapidly provision application environments to any machine, and access infrastructure from any platform. With a single, consistent code base to provision cloud services and developer resources, application development 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 is referred to as Infrastructure as Code (IaC). 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. IaC, however, replaces one-off scripts and version control issues with an efficient, automated process, and reduces 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.

**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.

**Cloud platform tools** – Management tools, such as OpenStack and IBM SmartCloud, that abstract provisioning from software-defined and physical infrastructure, and allow for quick deployment of system resources.

**DevOps tools** – A toolchain, owned by IT Operations and consumed by Application Development, that automates every step of the software development lifecycle.

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-management of the cloud resources they consume.

---

“

*“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.”<sup>2</sup>*

- ComputerWeekly

---

<sup>2</sup> [www.computerweekly.com/opinion/Infrastructure-as-code-What-does-it-mean-and-why-does-it-matter](http://www.computerweekly.com/opinion/Infrastructure-as-code-What-does-it-mean-and-why-does-it-matter)

Converting existing infrastructure to an SOI environment can be done gradually, one application workload at a time. IT can integrate old infrastructure into a new private cloud architecture, or retire and replace it with alternative private or public cloud resources. 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 responsive to feedback. 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 technology experts to the delivery of resources in a cost effective and timely fashion. With SOI, operations teams can focus less on the complexities of technology, and more on providing and integrating services for developers. In short, IT Operations must evolve into service orchestrators.

In this new model, IT Operations and Application Development must work together as owners and consumers of technology 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 SOI/cloud resources** – Acquire cloud services, 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.

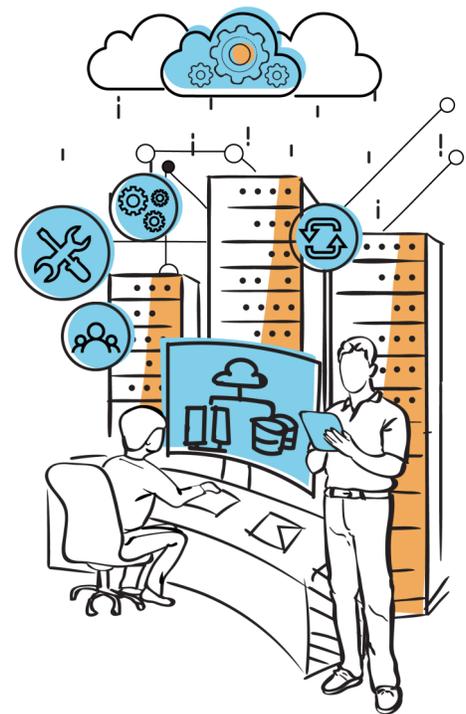
**Verify governance, risk, and compliance (GRC)** – Interface with GRC team to ensure IT operations meet corporate mandates.

**Oversee costs** – Manage 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.

“IT organizations are evolving from merely delivering technology to brokering services from multiple external and internal sources.”<sup>3</sup>

- CIO Magazine



<sup>3</sup> [www.cio.com/article/2908156/it-strategy/culture-clash-transitioning-it-into-a-service-broker-culture.html](http://www.cio.com/article/2908156/it-strategy/culture-clash-transitioning-it-into-a-service-broker-culture.html)

## Application Developers as Service Consumers

SOI 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 and manage 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 tool ownership versus consumption. Once acquiring tools from IT Operations, developers write scripts that automate the provisioning of SOI and simplify software lifecycle tasks using DevOps tools. Tools critical for SOI environment success include the following:

**Cloud Platform Management** – Tools that automate cloud provisioning and configuration management, and abstract the infrastructure from development environments so engineers can focus on new capabilities. These tools 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. Popular choices in this category include Ansible and Cloud Foundry.

**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 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 get better compute density, and allow developers to rapidly ship new features with higher security and quality. Popular containers include Docker and Kubernetes.

**Service Catalogs** – An interface for application developers to select from a curated collection of development environments which promotes simple and consistent provisioning. Service catalogs allow developers to review options and choose specific and repeatable services based on their need. Furthermore, access control allows developers to view services only relevant to their role and department, which minimizes service proliferation.

As established, 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 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 specializes in combining cloud, analytics, digital, and security technologies with business acumen to help *Fortune* 1000 and emerging leaders achieve measurable results. With a track record of over 2000 successful client partnerships and engagements spanning 15 years, Trianz has enabled organizations, across dozens of industries and geographies, to define strategies that enhance and expedite the journey to cloud platforms and digital transformation.

Trianz' cloud practice specializes in building cloud strategies as well as secure, flexible, and scalable cloud-based solutions that reduce costs, improve productivity, and optimize operations. With deep domain expertise, knowledge of business applications, and experience across multiple platforms, Trianz offers a customized roadmap to service-oriented infrastructure and service catalogs with a focus on execution success.

Partnerships with leading cloud technology vendors including AWS, BMC, HP, IBM, Informatica, Microsoft, Oracle, and ServiceNow allow Trianz to remain cloud agnostic and customize hybrid architectures. Furthermore, Trianz' certified team of consultants use proprietary tools, templates, and workshops to discover, assess, analyze, and recommend strategies and execution plans, irrespective of where an enterprise is on their cloud journey.

Trianz cloud advisory services follow proven frameworks and include the following: Cloud Strategy and Roadmap Development; AWS Cloud Design, Build and Deploy; Private Design, Build and Deploy; Hybrid Cloud Design, Build and Deploy; App Migration; Cloud Manage; Disaster Recovery; and DevOps Services.

## About Trianz



Trianz simplifies digital evolution 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. For more information, visit [www.trianz.com](http://www.trianz.com).

Silicon Valley | Washington DC Metro | Rosemont | Chicago | Austin | Boston | Denver | Irvine | Raleigh | San Francisco | Seattle | New York  
Dubai | Bengaluru | Hyderabad | Chennai

[www.trianz.com](http://www.trianz.com) | [info@trianz.com](mailto:info@trianz.com) | +1-408-387-5800

@ Copyright 2018, Trianz. All rights reserved. No part of this document may be reproduced, stored in a retrieval system, transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the express written permission from Trianz. The information contained herein is subject to change without notice. All other trademarks mentioned herein are the property of their respective owners.