Composable Infrastructure

A software-defined approach to delivering fluid pools of resource

The article discusses:

- Evolution of IT architecture

- The emerging need and advantages of Composable Infrastructure

- Creating a software-defined infrastructure with Wipro's FluidIT framework

IT infrastructure ecosystem has undergone multiple transformations around parameters that provide significant improvements through optimization of applications and operations. The infrastructure evolution started from traditional platforms to usage of virtualization software, and progressed to hyper-converged infrastructure. Hyper-converged infrastructure combined with a virtualization software-simplified infrastructure and business processes, increases IT division's capability to not only become more stable but also be a profit center.

However, the combination of hyper-converged infrastructure and virtualization software is falling short of the requirements of modern day organizations. The new generation of organizations and applications lay down requisites such as on-demand availability of customized hardware resources and high operational velocity. The combination of hyper-converged infrastructure and virtualization software is not capable of facilitating hardware modularity and on-demand mix and match of hardware resources. Additionally, IT approach has always been focused on minimizing costs, but this approach is not sufficient as the new generation of organizations are also looking for high operational velocity. IT needs to build the ability to meet new business demands just-in-time.

The new requirements call for not only a redesign of the physical layer but also a paradigm shift in age-old methodologies of build and management. Composable Infrastructure (See Figure 1) creates the perfect ecosystem in which modern organizations can thrive.

With Composable Infrastructure software-defined infrastructure ecosystem can avoid buffer resource in different Datacenter Islands by having Dynamic Resource Management

Key points for social copy

- Composable Infrastructure creates the perfect ecosystem in which modern organizations can process new business demands just-in-time.

- Composable Infrastructure consists of multiple resources including, but not limited to, compute, storage and network that can make an infrastructure highly flexible, capable and sufficient to run applications, so that IT can deliver services quickly for consumption by business.

- Composable Infrastructure enables IT with the flexibility to compose and re-compose fluid pools of compute, storage, and network resources, based on a given requirement.

- Composable Infrastructure brings an integrated software-defined intelligence that includes self-discovery, auto-integrate, provision and scale out.
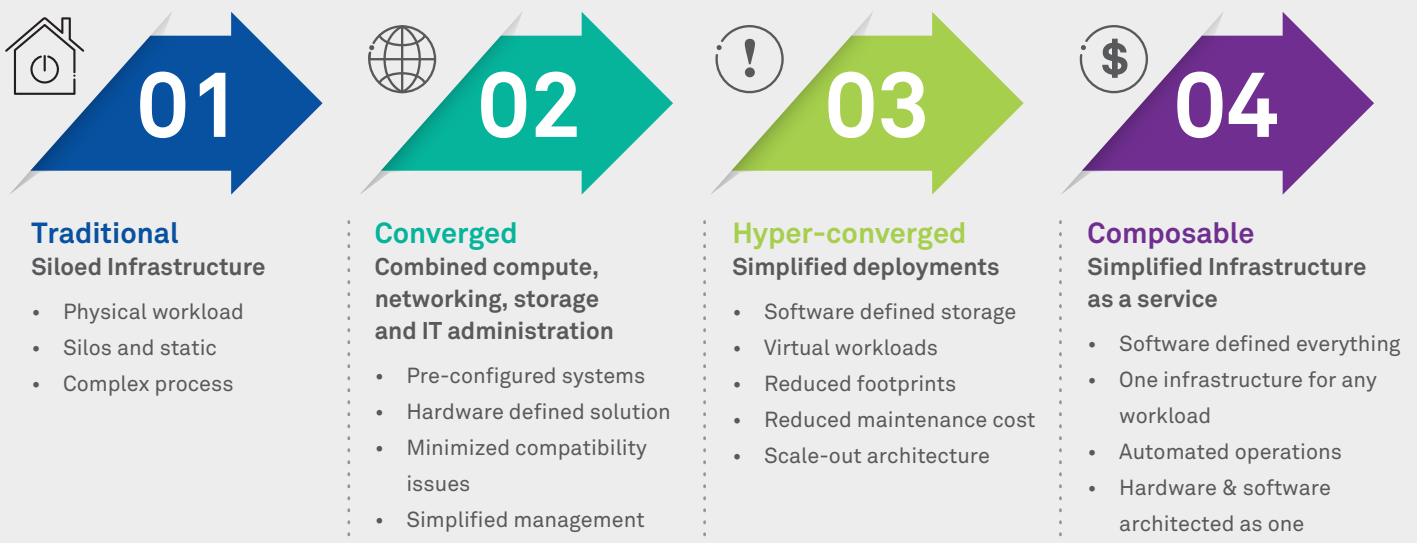
01

Traditional
Siloed Infrastructure

- Physical workload
- Silos and static
- Complex process

02

Converged
Combined compute, networking, storage and IT administration

- Pre-configured systems
- Hardware defined solution
- Minimized compatibility issues
- Simplified management

03

Hyper-converged
Simplified deployments

- Software defined storage
- Virtual workloads
- Reduced footprints
- Reduced maintenance cost
- Scale-out architecture

04

Composable
Simplified Infrastructure as a service

- Software defined everything
- One infrastructure for any workload
- Automated operations
- Hardware & software architected as one

Figure 1: Evolution of IT infrastructure

Why Composable Infrastructure?

Composable Infrastructure helps IT to respond to the challenges laid down by new organizations. It can be considered as the next phase of hyper-converged infrastructure or the next version of on-premise infrastructure. Composable Infrastructure consists of multiple resources including, but not limited to, compute, storage and network that can make an infrastructure highly flexible, capable and sufficient to run applications, so that IT can deliver services quickly for consumption by business. It eliminates the need for workload-specific environments thereby eliminating silos and provides a fluid set of resources that can be dynamically combined to meet the unique needs of any application.

Composable Infrastructure enables best application performance, reduces underutilization and overprovisioning, and creates a more agile and cost-effective datacenter. It enables IT to provision on-premises infrastructure with the speed, agility and simplicity that is seen while deploying and provisioning resources on the cloud.

Composable Infrastructure enables IT with the flexibility to compose and re-compose fluid pools of compute, storage, and network resources, based on a given requirement. Additionally, unified APIs fully automate the composition and decomposition of resources, and enables programming of a significant number of infrastructure elements. Composable Infrastructure brings an integrated software-defined intelligence that includes self-discovery, auto-integrate, provision and scale out. This intelligence is achieved by implementing a software-defined approach towards lifecycle management of physical infrastructure. Composable infrastructure has three components - Composable Compute, Composable Fabric, and Composable Storage (Shown in Figure 2).

Fluid pools of compute storage, and network resources, which can be composed and re-composed based on the requirement

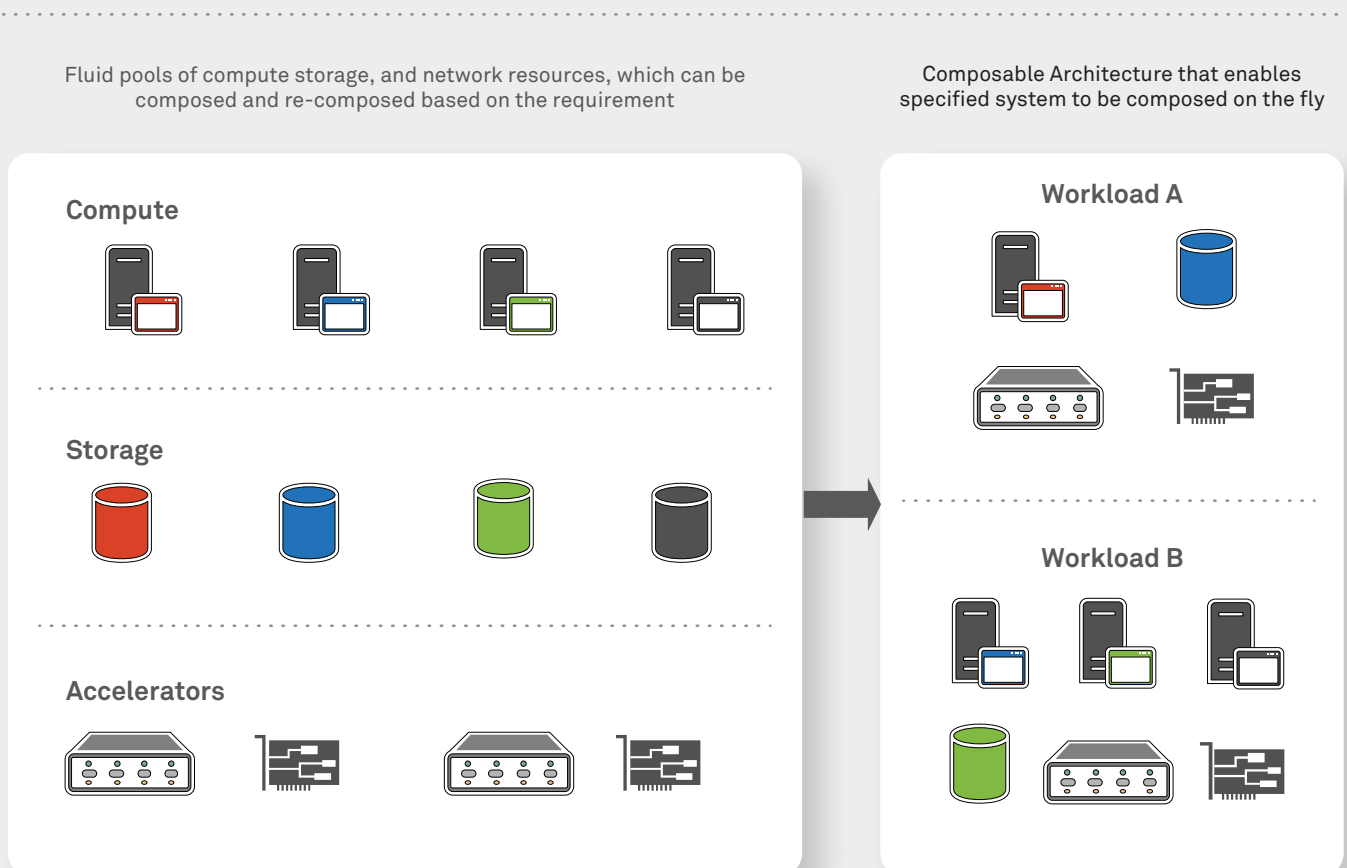Composable Architecture that enables specified system to be composed on the fly

Figure 2: Components of Composable Infrastructure

1. **Composable Compute:** Composable Compute provides performance, scalability, density optimization, storage simplicity, and configuration elasticity for physical, virtual or container-based workloads. Composable Compute delivers flexibility as comparable to that available from a converged or a hyper-converged system.

2. **Composable Fabric**: Composable Fabric, which is multi-fabric connectivity, is designed to optimize the workloads across the infrastructure. The module has intelligent network capabilities, consolidates the backend datacentre connections towards compute, extends the connectivity to interconnect modules and also eliminates the need for top of rack switches.

3. **Composable Storage:** The Storage module provides a fluid pool of storage resources for compute/workloads to consume. It allows expansion and reduction of storage allocated to compute and delivers the flexibility to meet the storage demands of a wide range of data workloads.

Creating a software-defined infrastructure ecosystem

Flexible and scalable application development demands a framework that leverages accelerators like blueprints, reference architectures, management tools and native composable fabric of a Composable Infrastructure.
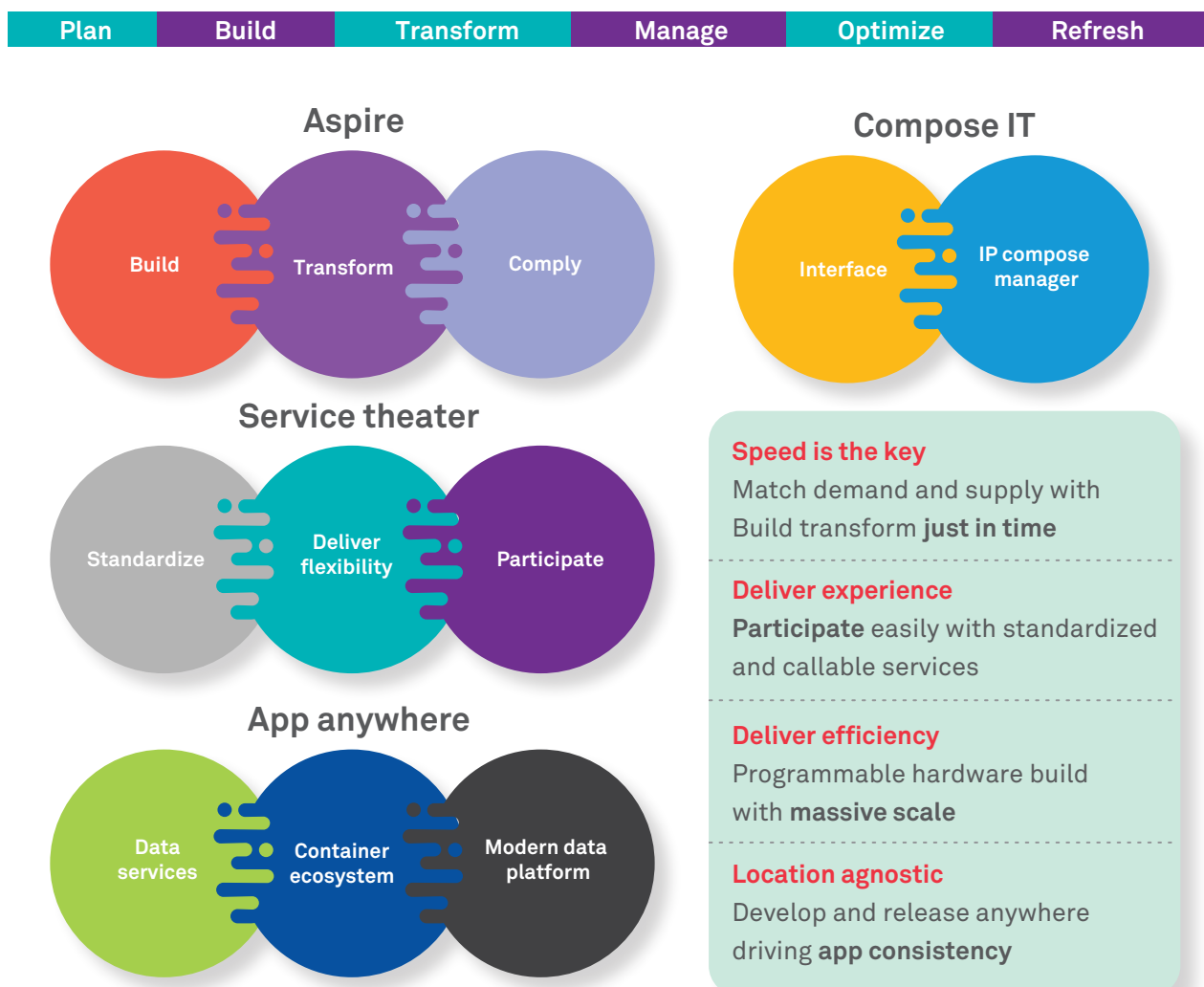
| Plan | Build | Transform | Manage | Optimize | Refresh |

Aspire

Build   Transform   Comply

Compose IT

Interface   IP compose manager

Service theater

Standardize   Deliver flexibility   Participate

Speed is the key
Match demand and supply with Build transform **just in time**

Deliver experience
Participate easily with standardized and callable services

Deliver efficiency
Programmable hardware build with **massive scale**

App anywhere

Data services   Container ecosystem   Modern data platform

Location agnostic
Develop and release anywhere driving **app consistency**

Figure 3: Wipro's FluidIT framework

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Wipro's FluidIT framework comprising of ASPIRE, Service Theater and Composable Infrastructure delivers a programmable software-defined infrastructure ecosystem that forms the foundation of an end-to-end, software-defined datacenter and hybrid cloud.

ASPIRE is a build integration tool that automates deployment and provisioning of workloads just-in-time based on blueprints, best practices and certified architectures.

Service Theater is a single console platform that delivers simplified and automated provisioning through its build workflows leveraging ASPIRE. Additionally, Service Theater also delivers management with high-end analytics and reporting for heterogeneous software-defined appliances integrated with Service Theater API platform. Service Theater facilitates heterogeneous management, deep analytics and ties all ends of IT operations into a single close-knit automation framework.

Composable Infrastructure provides a solid, yet flexible foundation of resources.

These three elements enable Wipro FluidIT to weave infrastructure and applications into a single platform (See Figure 3).

Wipro's FluidIT framework is a unified, hybrid, container-based application deployment platform that enables an organization to accelerate the pace of application development and reduce the time to market. The platform offers seamless scalability and flexibility by leveraging a proven, tested framework consisting of blueprints, reference architectures and management tools.

Wipro uses its accelerators ASPIRE and Service Theater to onboard the on-demand use cases on Composable Infrastructure. The accelerators bring hyper-automation during deployment and management of use cases on Composable Infrastructure. This in turn results in lowering of costs, improvement of staff productivity and facilitates users with the capability to provision system and services from a single platform. Benefit spans across multiple directions (See Figure 4).
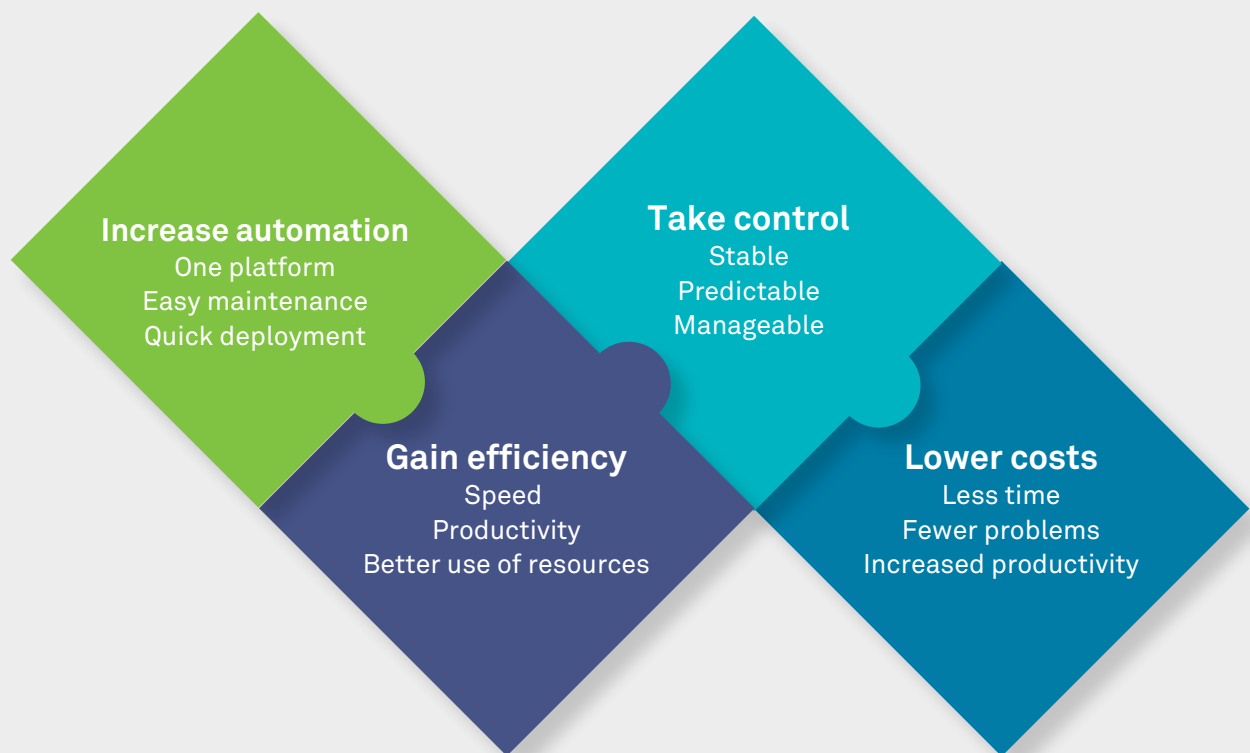

Increase automation
One platform
Easy maintenance
Quick deployment

Take control
Stable
Predictable
Manageable

Gain efficiency
Speed
Productivity
Better use of resources

Lower costs
Less time
Fewer problems
Increased productivity

Figure 4: Benefits of Wipro's FluidIT framework

Conclusion:

Composable Infrastructure operates at the core of Wipro's FluidIT Framework. It supports Wipro's FluidIT architecture by delivering fluid resource pools that reduce operational complexity for traditional workloads and increases operational velocity for next-gen applications and services. Composable infrastructure facilitates dynamic configuration and customizations as per workload requirements. The result is effortless configuration and reconfiguration of Composable Infrastructure with software-defined intelligence powered by ASPIRE and Service Theater that result in efficient utilizations and reduced time to market.

About the authors

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