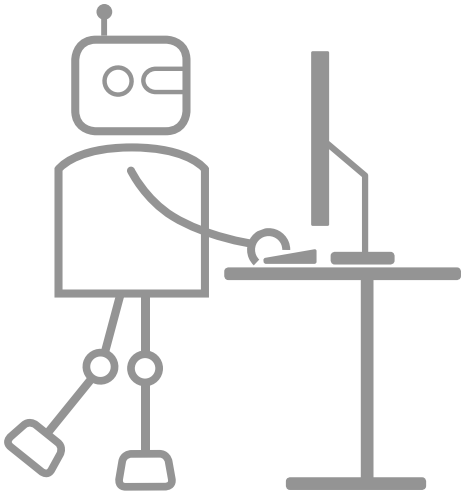
A SOLIDFIRE PAPER

The Five Principles of the Next Generation Data Center

NetApp



Why read this article?

Cisco's global cloud index report predicts that by 2018, more than 78% of workloads will be processed by cloud data centers; 22% will be processed by traditional data centers.

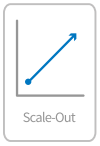
There's no denying it: The enterprise is moving to the cloud. Public clouds like Amazon Web Services (AWS) demonstrate the possibilities for next generation IT deployment: rapid elasticity and high performance at lower costs.

In the traditional data center, attempts to improve the end user experience often coincide with increased complexity on the server side. Dynamic workloads simply cannot scale in a traditional infrastructure without reconfiguration and hardware investments, putting more pressure on constrained IT time and budgets.

Building a cloud infrastructure requires highly organized design methodologies but eliminates the need for silos that elevate risk and hold IT back.

In this article we discuss the five principles of a successful Next Generation Data Center (NGDC).

Scale-Out



Scale-out offers seamless, transparent resource expansion without the cost and complexity of traditional infrastructure migrations.

Whereas the traditional scale-up architecture relies on dedicated physical servers with stranded resources, in the NGDC, resource pooling provides nondisruptive horizontal expansion across data center layers. Scale-out infrastructure design removes that age-old problem of performance degradation occurring as infrastructure resources are spread out.

Scale-out is possible simply by adding or removing nodes. While a traditional scale-up architecture is limited by the hardware it operates (faster hardware likely requiring significant migration efforts), scale-out offers a wide range of resource expansion options, allowing the enterprise to leverage IT investments consistently across the data center infrastructure and over the long-term.

Guaranteed Performance

In the NGDC, raw performance is half the solution — quality of service resource controls must be used across the entire infrastructure or any guarantee is only as good as the weakest link.

A legacy storage model can provide capacity on-demand, but it struggles with allocating performance resources efficiently because it was not built to support the individual capacity and performance requirements of collective workloads. An enterprise is then forced to purchase more storage than it needs, driving costs up and efficiencies down.

The balancing act between performance and capacity in NGDC storage design enables guaranteed performance with true QoS and reduced OPEX. What virtualization enabled in compute resources is now available in NGDC storage architecture: pooling and isolation of separate resources, reservation of resources for critical workloads, and moving resources dynamically from workload to workload.

Automated Management

Automation across the stack is vital in the NGDC, where speed is an innovation rule.

Enterprise IT is charged with enabling innovation and growth. If IT gets in the way, the enterprise risks revenue loss and significant disruption by more agile competitors. NGDC automation maximizes business results with policy-driven provisioning and resource allocation and eliminates endpoint-centric administration. Automating tasks and orchestrating workflows are fundamental in the enterprise if service delivery needs are expected to be met at scale.

Scripting common and/or disparate infrastructure tasks with APIs dramatically reduces errors, increases productivity, and streamlines service delivery by enabling efficient sharing of data and processes. Employing software automation to take charge of decision points changes the paradigm from the physical limitations of hardware to the unbounded design capabilities of software.

Data Assurance

NGDC enterprise architects plan for failure while mitigating its likelihood of occurrence.

In the legacy data center, infrastructure was customized with speciality hardware to ensure a failure would not negatively impact specific applications. The applications were saved and the price was paid in over-engineering. In the NGDC, a resilient and secure infrastructure is the expectation and failure is managed because the self-healing architecture is designed to tolerate it.

Using automatically programmed, predefined priorities in the NGDC, hypervisors can redistribute VMs from areas of contention to other areas without workload disruption. When loads on individual VMs change, automatic resource optimization and relocation reduce the need for administrators to respond. Time is dedicated to high-level tasks and risk of data loss or sevice is avoided.

Global Efficiencies

Fewer systems and fewer interfaces between components are pillars of global efficiencies in the NGDC.

The traditional data center model was built on the premise that more capabilities would require more resources — be it physical, financial, or human resources. In the NGDC, enterprises are not burdened with excess IT resources.

IT decision makers are consolidating and converging the people, software, and processes that fueled underutilized silos and IT sprawl.

Enabling global efficiencies begins with improved utilization of server platforms, networks, and storage protocols, as well as the vendors and IT teams that support each layer. Consolidation enables IT to take charge of perceived activity, seasonality, and typical usage, while controlling oversubscribed resources. Like airline carriers that practice overbooking, NGDC administrators can programmatically govern thresholds to meet customer expectations, maximize utilization, and control costs.

Designing the Next Generation Data Center

This article skims the surface on applying the five architectural principles of the Next Generation Data Center. For an in-depth breakdown of each tenet and thorough discussion on key market influences leading the enterprise IT transformation, be sure to read our white paper, “Designing the Next Generation Data Center.”