



# Cost Leadership in End-User Computing: Virtual Desktops, Real Savings

WHITE PAPER

**Table of Contents**

A Brief Cost History of VDI to 2012 ..... 3  
2013 - Storage Appliances and Modular Hardware..... 3  
2014 - Horizon 6 and Capital-Cost Leadership..... 4  
2015 - Horizon 6 Moves on with App Volumes and EVO ..... 4  
DaaS - Driving New Savings in Operational Costs..... 4  
The Journey Continues ..... 5  
Our Hybrid Goal ..... 5  
What Next? ..... 5

VDI has long demonstrated a lower TCO than physical desktops, but the savings were driven by differences in operational costs. Until mid-2014, average per-user *capital* costs for VDI were actually higher, representing a barrier to adoption for many organizations. Cost evaluations and TCO reports from market analysts consistently reinforced the “pay more today to save later” VDI model.

With the launch of [VMware Horizon® 6](#), the scenario changed: VDI is now the lowest capital-cost option, too. This is a significant landmark for end-user computing, but not the end of the story. VMware sees cost reduction as a journey—and there are more steps to come. This paper describes the progress so far and some of the progress VMware intends to make in the future.

## A Brief Cost History of VDI to 2012

From the first VDI deployment in 2001, the value proposition of the architecture was clear: Multiple users share common data center infrastructure (servers, storage, network, and facilities) and securely access their desktops remotely. Compared with physical desktops, virtual desktops have more components, but their centralized and shared infrastructure brings efficiencies, and hence savings, in operations. VMware business-case estimates from 2012 (built for VMware customers with their own cost data) show that customers were averaging 500 users per member of IT operational staff, compared with only 200 users per IT staff member for physical desktops.

Advances in the underlying virtualization technology and the commoditization of hardware drove steady reductions in the per-user cost of servers and networking, but the cost of storage remained high and was the single biggest factor in keeping per-user capital costs higher than costs for a physical desktop. By 2012, the cost equation was simple: Spend up front to save over a lifetime of use and deployment. Industry analyst estimates typically showed annual cost reductions of around 10 percent, but initial capital expense was 10 percent higher. The business case data showed the same trend, but with different figures: 28 percent annual reductions for 25 percent more capital expense.

## 2013 – Storage Appliances and Modular Hardware

Most of the early VDI deployments used storage area networks (SANs) to support desktop images and user data. These SANs offered good performance, but the cost was too high for many organizations, even with nonpersistent desktops. A lower-cost storage option was clearly required.

The VDI ecosystem stepped up to the challenge and delivered new storage products optimized for virtual desktop deployments. Companies like Atlantis, Tintri, Nutanix, Nexcenter, and EMC all released smart appliances that significantly drove down per-user storage costs. VMware business case data shows that average storage costs for 2,500 users with a 30 GB image and 5 GB of user data fell from around \$230 per user in 2012 to \$140 in late 2013.

The cost reduction was significant, but still not enough. By the end of 2013, analysts’ TCO estimates showed the capital costs of VDI were nearly equal to, but still slightly higher than, the capital costs of physical desktops.

## 2014 – Horizon 6 and Capital-Cost Leadership

2014 saw the release of VMware Horizon 6 and, for the first time, the per-user capital costs of VDI fell below the cost of physical desktops. The primary cost-saving category was again storage, where VMware Virtual SAN™ technology delivered major capital cost savings.

Virtual SAN uses direct-attached storage in servers to build a virtual storage area network—delivering, in effect, on the long-term promise of low-cost, gridded storage. A combination of solid-state drives and disks maintains I/O performance, and the savings are dramatic: For the same deployment model (30 GB image and 5 GB of data), storage costs with Virtual SAN fell to a little over \$50 per user.

Greater proximity of storage to servers (through Virtual SAN) also enabled an increase in the number of users each server could support and there were proportionate reductions in related operational overhead too. Overall, there were average per-user reductions of more than 25 percent in capital costs and 10 percent in operational costs. VDI now held cost leadership.

## 2015 – Horizon 6 Moves on with App Volumes and EVO

Only weeks after Horizon 6 was released, VMware announced the acquisition of CloudVolumes, enabling the next step in the cost-reduction journey. Now branded VMware App Volumes™, this product uses smart isolation technology to deliver “stacks” of applications in close to real time to any desktop. App Volumes also delivers a significant reduction in per-user storage requirements. Thus far, VMware business cases in the field show reductions of at least 30 percent in required storage space, and lab tests indicate possible savings as high as 70 percent. Whereas Virtual SAN reduced the unit cost of VDI storage, App Volumes reduces the number of storage units required.

EVO is the VMware hyper-converged infrastructure initiative—combining storage, server, and networking infrastructure into an appliance that is quick to deploy and simple to manage. The first product, VMware EVO: RAIL™, is designed to minimize operational overhead: Infrastructure management, image management, and help desk costs for Horizon 6 Enterprise on EVO: RAIL should total less than \$12 per user per month. By comparison, the figure for VDI before Horizon 6 was \$16 per user per month and a typical “enterprise” physical desktop cost about \$40 per month.

VMware EVO: RACK™, which will follow later in 2015, is designed for higher-scale deployments and will consolidate these operational cost savings with further reductions in capital costs.

## DaaS – Driving New Savings in Operational Costs

Horizon 6 is the VMware on-premises product, but other areas of the desktop portfolio are bringing savings to customers, too. VMware Horizon Air™, the desktop-as-a-service offering, splits desktop-image operational tasks between the categories of core image and application customizations, with only the latter overhead borne by the customer (all core image management is done by the service provider). Average operational and administrative costs per user are cut by nearly half.

## The Journey Continues

In isolation, the cost-saving advances VMware has made with on-premises and off-premises products are already significant. In combination, they change the VDI cost and value equation completely—and it is not just VDI. The same Horizon 6 and Horizon Air platforms support other delivery models, too (published applications and desktops), and the savings apply to these additional delivery models in much the same way.

And the innovation continues! VMware is already working on initiatives to drive down capital and operational costs for on- and off-premises deployments still further.

## Our Hybrid Goal

By combining the capital-cost reductions of Horizon 6 with the operational-cost savings of Horizon Air, VMware has set a new per-user cost goal that resonates with the aspirations of our customers: \$30 per user per month for all infrastructure (server, storage, network, access device), software, and operations (help desk, desktop and image management, infrastructure management).

How far away is this goal? Not far: VMware estimates that Horizon 6 Enterprise with App Volumes has taken average per-user costs down to \$36 per month (again, for 2,500 users with a 30 GB image and 5 GB of user data). By comparison, a physical desktop today averages about \$62 per user per month. Further reduction in capital and operational costs can be achieved, and VMware will continue to drive these reductions through both Horizon 6 and Horizon Air.

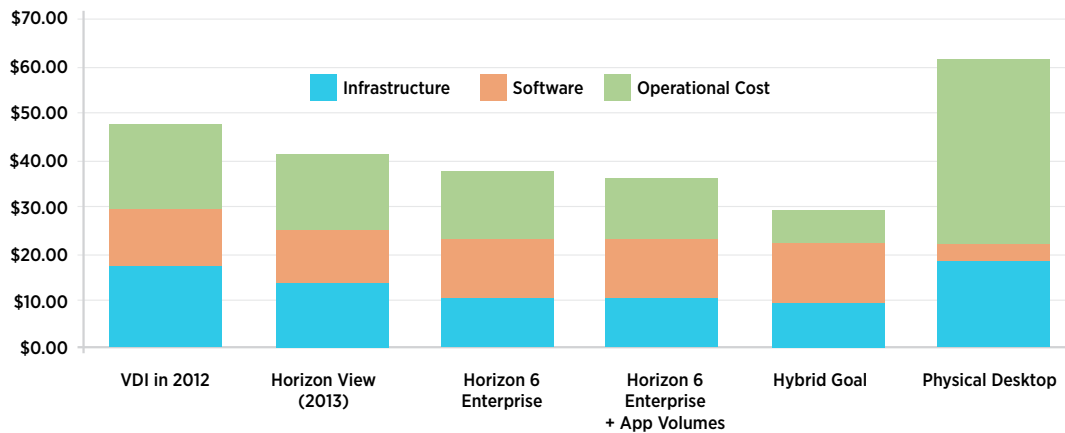


Figure 1: Comparative Cost Evolution per User per Month

## What Next?

If you are considering your next round of investment in end-user computing and have dismissed VDI as an option because of cost, look again! While “mileage may vary” and your costs might not be average costs, the advances described in this paper are real and benefit everyone. If you are a partner currently delivering a more expensive solution or using a more expensive solution stack, it is time to get up to date.

