VirtuCache Case Study

USE CASE
- VDI Density

LOCATION
- Paris, New York and San Francisco

VIRTUALIZATION AND STORAGE ENVIRONMENT
- Custom built servers using Intel 10 core E7 8800 processor, 512 GB RAM, and four 10gbps NICs.
- Custom built iSCSI storage appliance that be linearly scaled-out to support their multi-tenanted VMware deployment.

CHALLENGES
- Reduce dollar per virtual desktop for their subscribers.

SOLUTION
- Increased number of VMs per host from 124 to a maximum of 512 allowed by VMware.
- Reduced cost per Windows virtual desktop by ¼.

The VirtuCache Difference

VDI deployments have two bottlenecks that prevent deploying large number of VMs on a physical server – memory and storage latencies. By serving more and more IO from in-server SSDs storage latencies are much reduced, resulting in the ability to deploy larger number of virtual desktops on each VMware host

VirtuCache increased VDI density from 124 to 512 per host

Profile
France Telecom is one of the world's leading telecommunications operators, with a presence in 32 countries, and a customer base of 232 million.

Main Challenge
France Telecom wanted to provide the lowest dollar per virtual desktop to their subscribers

Server and Storage Infrastructure
Selecting an appropriate server was key to delivering low cost virtual desktops.

a. Since a higher powered CPU was cheaper on a per core per GHz basis than a smaller CPU, and similar logic held true for other server side resources like memory and interface cards, France Telecom decided to go with a powerful server, with just enough compute, memory, and networking resources to successfully deploy 512 VMs, which was the maximum number of VMs allowed by VMware on a single physical server.

b. Also the server specs had to be such that CPU, memory, networking, and storage resources, would all saturate at the same time. This would ensure maximum utilization of server side resources.

For storage, they used a home grown disk based iSCSI storage appliance, which had an upper limit of 25,000 IOPS. It was well understood that storage IO could choke before memory capacity (which typically is the other bottleneck in VDI deployments).

Workload Characteristics
France Telecom Engineers used VMware View to spin up VMs. Each VM had a predefined workload that did 600 KBps reads and 200 KBps writes.
Without VirtuCache, 124 VMs were successfully spun up with resulting Guest Average Latencies (GAVG) in each VM approaching 50 milliseconds.

VirtuCache Deployment
Next, VirtuCache was installed, and configured to cache data from disk based iSCSI storage appliance to four 800GB Seagate SAS SSDs configured as a single volume behind an Adaptec Series 7 RAID controller card.
The same test was repeated. Now 512 virtual desktops were successfully spun-up on the host. The average guest latency was under 20 ms for each VM. As was stated earlier, 512 is the maximum number of VMs that can be spun-up in VMware. Also, memory was maxed out at this point.

VirtuCache was able to eliminate the storage IO bottleneck, with the result that memory, storage IO, and CPU were saturating simultaneously, which was the intended goal of this exercise.

Cost Per VM
It was estimated that the cost per VM to France Telecom was about $12/desktop/month, inclusive of hardware costs, VMware licensing costs, and Windows licensing costs.