**VMWare ESXi Physical Topology Diagram**

**Pretence:**

A cluster of three physical servers, each running four dual core processors, running at 8GHz with 16GB memory carries a total computing power of 192GHz, with 48GB memory. Using a vCenter server, this setup is able to accommodate a maximum of 32 ESXi hosts, all supporting up to 1024 VMs. Of course, for the schools scale of students, this is insanely over the top, however this data can be used as a base for the schools system.

**Implementation**:

A cluster of physical servers seems like the right way to go. There are currently three physical servers on site at the school. These servers will be clustered together using vSphere and vSphere High Availability(HA) to create one resource pool for ESXi hosts to run desktop VMs from which are accessible by students/staff.

Each server currently holds one CPU with 4 cores of 3.5GHz processing power, with 32GB memory, leaving the cluster of all three with 42Ghz of processing power, and 96GB of memory. This is a fair bit of processing power but of course, maximising the amount of VMs is not ideal, as it would need to run perfectly and avoid all failure which is an unrealistic goal.

Since we don’t need anywhere near as many VMs - only enough to accommodate for the 1,500 students + staff, along with the projected increase in students – we can opt for using much less processing power, and reserving leftover power for failover/alternate server purposes (ADDS, Email, Database DHCP, and DNS). This lines up well with the host set up expectations of vSphere; HA vSphere clusters perform better when 8 or less hosts are on the cluster, and are able to host even more VMs per host. So then, the cluster should accommodate for a maximum of 8 Hosts, with each host running 256 VMs. That can be accessed at any time. The functionality allows the processing power to be assigned dynamically to whatever is running on any of the hosts. This means the processing power will only be assigned to hosts as needed, as students or staff log onto the VMs. Since it is extremely unlikely that all 2048 VMs are going to be running at once, there will almost always be processing power left over for protection against failures.

vSphere’s HA failover protection against hardware and operating system outages are already in place to monitor and avoid hosts failing, causing a slow reboot of all VMs on that host. If one host is detected as crashed or failed, VMs on that host will start up again on a different host, avoiding the slow reboot with very little loss of processing power, as the cluster allows the processing power of the failed host to be transferred to the other host within minutes.

Processing power allocation priority can also be set through vSphere, ensuring the server VMs always receive enough processing power to run smoothly.

Finally, virtualized storage will allow the large pool of VMs in the network to interact with one large pool of storage devices. This means all students/staff will be able to access any data they saved on the Virtual Desktop Infrastructure from any VM, and of course, they will not be logging onto the same VM every time, so this is a must.

A border firewall will be put in place between the schools network and the eduProxy server, to block any unwanted traffic from outside the network.

A picture containing text, sign

Description automatically generatedA picture containing text, sign

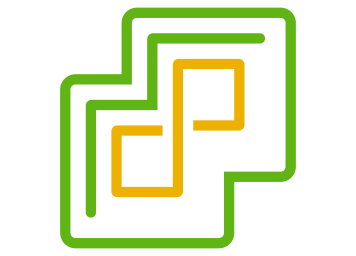
Description automatically generatedA picture containing text, electronics, display, picture frame

Description automatically generated

User End Devices (BYOD applies)

A picture containing text, sign

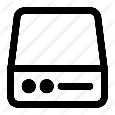
Description automatically generated

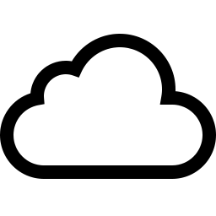
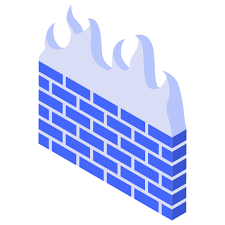


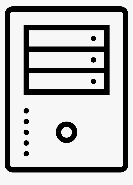
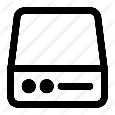
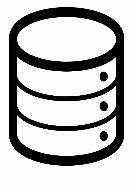
vSphere Client Interface

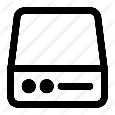
Physical Storage Devices

High Availability Server cluster







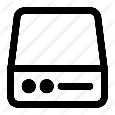


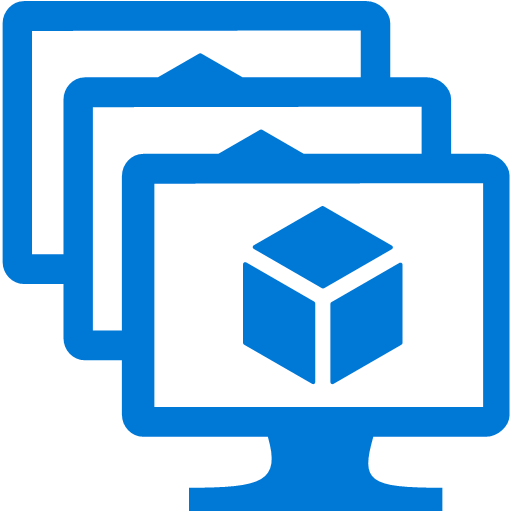
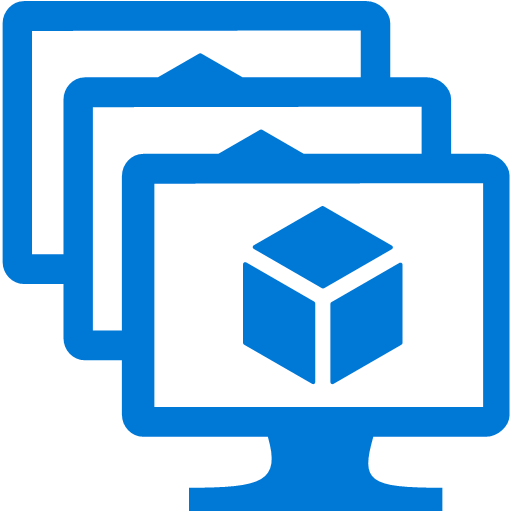
Virtual storage pool

eduProxy Server

Border Firewall

VicSmart





8 ESXi Hosts, all capable of running up to 256 VMs for student/staff access

1 host with reserved processing power for running basic servers (email, DHCP, etc)