Plainedge Union Free School District

DataCore and VMware-Powered VDI Deliver an Astounding User Experience to Teachers and Students While IT Team Meets All Objectives with High Availability and High Throughput

The Plainedge Union Free School District ("Plainedge") is located in North Massapequa in Long Island, New York. Plainedge is a K-12 public school system and is one of approximately 156 school districts on Long Island. The school district comprises five schools – three elementary schools as a well as Plainedge Middle School and Plainedge High School. Plainedge UFSD has approximately 700 employees, roughly 3,000 students and the local government body for the school district is the Board of Education.

Funded by tax dollars, Plainedge is like most districts in that it is facing shrinking budgets. However, it also has the need to reduce the complexity of its IT infrastructure. In many respects, school districts are more complex these days than some corporate entities in terms of their IT infrastructure needs.

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"We have to deliver such a widespread offering of IT initiatives, through software and different types of hardware technologies," stated Dr. Guy J. Le Vaillant, Assistant Superintendent for Human Resources & Instructional Technology, Plainedge Union Free School District. "They consist of everything from interactive multi-touch whiteboards, HD streaming video, wireless document cameras, 3D printers, digital photography, STEM and Robotics, and remote AutoCAD, to running all of our databases for the district's financial reporting, student management, transportation routing and scheduling, phone systems, and Webex presence. In addition, we have all of the specialty student software end portals and online testing access. The list literally goes on and on."

AN INFRASTRUCTURE THAT IS NOW TOTALLY VIRTUALIZED

Plainedge is currently 99.8% virtualized according to Lortie, apart from two regular hardware servers acting as Domain Controllers, DNS and DHCP Servers at each site. Everything else is virtualized – the entire infrastructure, including the organization's Cisco phones, voicemail and GoToMeeting systems.

Performance

"Even before introducing auto-tiering, we have seen enormous improvements in performance," stated Lortie. "With auto-tiering, everything managed by DataCore as backend storage now benefits from the auto-tiering – not just the memory caching – so there has been another boost of performance across the entire infrastructure."

Auto-tiering

With DataCore, Plainedge has been able to recapture stranded capacity and dynamically place workloads on the right devices based on their importance. With multiple vendor devices at work, operating under the DataCore storage virtualization umbrella, auto-tiering has now automated what the Plainedge IT team could not do manually. And that has been to constantly match storage where it is most effective and efficient in order to get the most optimal performance possible.

Moreover, according to Dr. Le Vaillant, "Teachers and students today just want technology to work and they expect it to work 24 hours a day and seven days a week, In fact, our goal is that IT resources should be like running water to the endpoint user – it should just be available when they need it, always on and reliable."

Speed, efficiency and uptime all result from having the right – or wrong – storage deployed. Plainedge's IT systems also support a complex video surveillance system, which places a lot of demands on storage. There is an upgrade to the theater in the works, and Plainedge is about to begin recording and streaming out student performances. Moreover, there is an inordinate amount of multimedia that is being kept in the IT environment on both the operational side as well as for students and teachers. All of this and more make up the digital assets at Plainedge..

VIRTUALIZED DESKTOPS & VIRTUALIZED SERVERS NEED VIRTUALIZED STORAGE

Dr. Le Vaillant explained his choice to virtualize desktops as follows:

In the past before Plainedge virtualized, every year he had to reimage thousands of PC's – and even with antivirus software running, the PC's would get corrupted somehow, icons would disappear, hard drives would fail, updates would not install properly, and there was always something to do to get the PC back to a functional state. PC's would run slowly and they would take forever to log-in. Because they had moving parts; they wouldn't last very long. So he was constantly dispatching people and using up manpower to solve issues with the endpoint – the desktops. Not only was this inefficient from an operational standpoint – due to the cost constraints – but it was far from efficient from an organizational standpoint, as far as delivering a positive end-point experience.

"Teachers need the technology in classrooms to work," stated Dr. Le Vaillant. "Teachers can't be wasting valuable instructional time with slow login times and troubleshooting IT issues in the classroom. They need to maximize that time for student learning."

It was at this previous school district that Dr. Le Vaillant and Jean-Claude ("J.C.") Lortie, Senior Systems Engineer at CSDNET, a DataCore-authorized partner and IT solutions provider, started their work with VMware and VDI initiatives. Le Vaillant saw firsthand the benefits of VDI (Virtual Desktop Infrastructure) to deliver the endpoint experience. Dr. Le Vaillant and J.C. Lortie brought this experience to the Plainedge School District.

Now, Plainedge is a complete zero-client VDI implementation, using Dell Wyse P25 and P45 devices.

"We have no PC's and teachers love it," noted Dr. Le Vaillant.

These Dell Wyse P25 and P45 zero-client devices that are in every classroom each have a small profile.

The zero-client devices have no hard drives, no moving parts, and they contain no software image that can be altered. Each device is virtually "instant on" and draws less than six watts when on and less than one watt when in stand-by mode. Because the devices are linked clones containing no software image, they can't be altered even if they get a virus or spyware – meaning the icons displayed always stay protected and therefore intact. Teachers and students have the same experience no matter where they login. What's more, teachers and students login in very quickly and teachers who move from classroom to classroom can reconnect to their virtual machine with their desktop still loaded with all of their application in less than three seconds.

Once the server and network infrastructure was built out, it became evident to the IT team that storage was the last frontier to make data highly available.

"As a result of trial and error and in a quest for true high availability, Plainedge ended up with quite a few storage devices," explained Dr. Le Vaillant. "I have a legacy EMC device that was here when I arrived, which the district invested a lot of money in. We have quite a few HP legacy storage arrays."

Plainedge also has some Dell EqualLogic arrays with SSDs that Dr. Le Vaillant put in to handle the I/O and performance needs of VDI.

Dr. Le Vaillant knew the school district needed a highly available infrastructure split over two data centers to maintain high availability even when one site was temporarily out of commission. This, coupled with the fact that Plainedge had a number of devices from multiple manufacturers, left Plainedge facing a decision as to whether abandon (or re-task in an efficient manner) the EqualLogic devices (which was not really an option) and go all-in for EMC to get the functionality it needed for high availability, redundancy and auto-tiering – or abandon EMC outright and go with an all-EqualLogic solution.

"We kept looking at costs, and we really did not feel good about either way forward until we found DataCore," noted Dr. Le Vaillant.

Dr. Edward A. Salina, Superintendent of the Plainedge School District states, "The transformation in the instructional technology infrastructure has been phenomenal. Our conversations with teachers and administrators now center on instruction integration and no longer about what isn't working or loading fast enough in classrooms. Teachers can move from classroom to classroom and reconnect to their virtual desktops. In less than three seconds they are ready to teach."

DATA IN TWO PLACES

The IT team at Plainedge talks all the time with their IT solutions provider – and authorized and fully trained DataCore partner – CSDNET about the ways to improve its virtual infrastructure and how to take that to the next level. It was CSDNET that suggested the DataCore solution, which sounded like a great software-defined storage platform that could do for Plainedge on the storage-side what virtual servers do on the server-side. Most importantly, the DataCore solution delivers high availability to the overall data infrastructure.

"We are thrilled with what DataCore does on the storage side of the virtual infrastructure, and from a cost-perspective it is a complete home run in that it is vendor-agnostic," commented Dr. Le Vaillant. "I can take any storage that I have, run it behind the DataCore solution and that storage comes online, provides extra storage and is super-charged with the intelligence, performance and single management interface."

Plainedge did not have to abandon its investment in EqualLogic or EMC. And Plainedge is not trapped in an expensive, proprietary, storage hardware solution that becomes problematic later on. When necessary, Plainedge can rotate in and out different storage products. Plus, the DataCore softwaredefined storage environment can leverage Plainedge's flash storage – aggregating them into the virtualized pool.

Dr. Le Vaillant describes the caching as "great" and notes that it boosts data retrieval substantially and the IOPS are amazing. What's more, the IT team is quick to praise the ease-of-use of DataCore – even for such a comprehensive and robust solution.

"Redundancy is the key objective that DataCore solves so elegantly with intelligent, portable software. And the proof is in the uptime," stated Dr. Le Vaillant. "I can honestly say that by embracing softwaredefined storage with DataCore we have been able to transform the IT infrastructure and management of the IT environment at Plainedge. We like being proactive for maintenance, and we do maintenance all the time on our VMs. Because of the way virtual environment works with DataCore, we can take a storage device, put it into maintenance mode and do whatever updates we need to do to that device, and then put it back in service – without any interruption to our endpoint users."

PLAINEDGE UNION FREE SCHOOL DISTRICT'S VIRTUAL DATABASES & APPLICATIONS

Databases:

Oracle, Microsoft Exchange SQL, Microsoft SQL

Applications:

Powerschool (SIS or Student Information System), Microsoft Exchange 2013, Sophos Antivirus, Sophos antivirus email, Google Apps, Edutracker, Read 180, Transfinder (Transportation System), WinCap (Financial Software), AirWatch (MDM for iOS), ASSET (District Inventory), Lexmark (Lexmark management for printers in district), OTRS (Technology Support System), Terradici (Zero Client Configuration & Management), Varonis DatAnywhere (Plainedge Cloud service), Print Manager (Remote Print Manage System), Commvault (Backup System), VEEAM (Virtual Backup System), Ensemble (Media & Transcoder), Wowza (Media Streaming Engine), GFI Fax Maker (District Fax System), IPCELERATE (Emergency Lockdown System), WebEX, VMware Horizon 7 View, VMware VCenter, VMware VSphere, Cisco Telepresence Video Communication System

District Voice System:

Cisco Call Manager (Phone System), E911 System, Unity Voicemail System, Cisco Jabber

Microsoft:

Domain Controllers (Active Directory), DNS, DHCP, Web Server, KMS, WSUS, File Servers, SSO, DFSperformance possible.

IT SNAPSHOT

- **Primary Server Vendor that DataCore runs on:** Dell

- **Storage Vendor(s) that backend DataCore:** Internal SSD drives, EqualLogic and EMC VNX

- **Server Virtualization Platform(s):** VMware vSphere

- **Desktop Virtualization Platform:** Their entire district's desktop infrastructure is virtualized and consists of about 1,400 desktops, running on VMware Horizon 7; these are hosted by 16 hosts.

- **DataCore Managed Capacity (TBs):** 36 TBs (total)

- **Number of Users Serviced:** 3,600+

- **Number of physical "Host" servers:** 4 on the server side and 16 on the VDI side

- **Number of Virtual Servers (VMs):** 85

- **Number of Virtual Desktops:** 1,400

- **Operating Systems (being used in the virtualized environment):** Windows Server 2008 and 2012, LINUX and UNIX flavors, Windows 7 and Windows 10 desktops.

- **SSD/Flash Vendor(s):** Intel SSD's inside the DataCore nodes; EqualLogic storage is completely SSD; EMC unit has some "caching" SSD's.

- **Are you using auto-tiering?** Yes

- **Software-Defined Storage Platform:** DataCore SANsymphony

THE VIRTUALIZED ENVIRONMENT AT PLAINEDGE UFSD

Currently, Plainedge splits its network load by using two network centers – the High School and the Middle School. With VMware and the other tools being used, the IT team is able to split the physical load between the two buildings and the network sees it as one network center – which for redundancy and high availability works great.

On the vSphere side, in this initial phase the deployment includes several hosts and 85 Virtual Machines. On the VDI side, Plainedge is currently running 14 hosts and 1,400 desktops with VMware View.

"All of our installations are mirrored," stated J.C. Lortie. "With DataCore being flexible and efficient software, we at CSDNET are able to adhere to a virtual mirror philosophy whereby each and every drive that we create is always accessible from either location."

Two redundant DataCore nodes make this uptime possible – with one located at the High School and the other located at the Middle School. One of the mirrors links operates over a LAN, and the other mirror is a point-to-point dedicated fibre between sites.

The nodes run on Dell PowerEdge R730 XD servers. All of the storage "banks" are filled with solid state disks (SSDs) – specifically 1.5TB SSD drives. Plainedge has 18 TBs of SSD storage associated with each DataCore node, which is mirrored.

An existing EMC VNX 5300 array provides additional storage at the Middle School, while a couple of different models of EqualLogic arrays provide the remaining storage at the High School.

On the network side, Plainedge is running 40 Gbps bandwidth per DataCore server. Each DataCore server has four "uplinks" of 10 Gbps, in an active-active mode. The configuration is such that Plainedge has two 10 Gbps on the front-end and two 10 Gbps for inter-site mirroring.

"We are fully 'bullet proof.' Every site is totally independent and the virtual mirrors are running on each site," commented Lortie. "This is the beauty of the DataCore solution. It brings redundancy and availability to a user's storage. We have redundant network connections everywhere."

This redundancy is made possible because of a 4-core switch. This stack of four switches, whereby four switches serves as Shortest Path Bridging (SPB) core switches. So each host on each mirrored site has two switches. There are two core switches at the High School and two core switches in the Middle School.

"What these network configurations mean is that even if the network goes down entirely and there is a total network crash, the two DataCore servers will still be able to talk to each other over their own dedicated fiber," noted Lortie.

Dr. Le Vaillant is reticent to boast too loudly about the uptime of DataCore, for fear of jinxing things. But he did report that, "Since installing DataCore SANsymphony in a synchronous mirror configuration as the final piece of our virtualization deployment, my daily endpoint 'tickets' have almost gone away. We are able to shift our focus to keeping systems up to date, being proactive and supporting users by providing professional development, and supporting our instructional technology initiatives such as STEM and Robotics."

Dr. Le Vaillant admits there are still "tickets" being logged for IT support. But what has changed is his use of personnel. Now IT staffers are being used to keep up with maintenance and compliance issues that are mandated on a K-12 educational entity. Plainedge is heavily governed. The compliance requirements related to Disaster Recovery are manifold. Moreover, Plainedge operates with strong oversight to protect and recover confidential records and financial data. The policies and procedures related to such regulation are numerous, as required and enforced by Plainedge's auditors and as set forth in its Board of Education Policies.

"The bottom line is that with DataCore, we feel that we exceed the requirements of our auditors and we are in good shape with respect to compliance," summarized Dr. Le Vaillant. "We have transformed the manpower to do the things the organization needs us to do without constantly scrambling between data availability 'fire drills.' The IT staff is no longer tied up fixing interruptions, recovering from downtime, or responding to users who have lost their data."

COST-SAVINGS AND ROI REALIZED WITH DATACORE

DataCore has enabled Plainedge to save on costs in both the short and long-term.

"DataCore has allowed us to leverage our existing storage devices – no matter what vendor," stated Dr. Le Vaillant. "The ability to be vendor agnostic really empowers us to drive down costs. Because of DataCore, I did not have to go out and buy new EMC arrays for each site, and new EqualLogic arrays for each site."

The team at Plainedge was able to utilize the storage they had and set DataCore on top of those as a virtualization and integrated management layer that delivers unified storage services.

Dr. Le Vaillant added, "Even more savings will come in future years when it is time to replace the storage we have. We have yet to have a cycle of replacing existing storage. When we do, we just need robust physical devices that can handle the transactions. So we will be able to purchase new, replacement storage devices very economically without being tied to one hardware vendor."

THE SCHOOL DISTRICT OF TODAY: A CORNUCOPIA OF IT

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For additional information, please visit **datacore.com** or email **info@datacore.com**

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