

NComputing in Education— Growing Exponentially



Introduction

Even in the best of times, IT budgets for schools have been limited and erratic. In good budget years, there may be some funding to upgrade computer labs and update educational software. In bad years, funding can be severely squeezed. The recent economic downturn has placed tremendous funding pressure on schools and is directly impacting IT capital and maintenance budgets. Even districts that have limited capital funds are concerned about long term funding to sustain their technology expansion and upgrades. In addition to the funding pressure, IT leaders also face resource challenges. Tight school budgets have forced staff cuts or hiring freezes in most IT departments.

While IT professionals grapple with budget and resource constraints, districts are striving to improve educational outcomes by integrating technology with the classroom learning experience. Instead of occasional trips to a shared computer lab, educators want to provide wide-scale computer access directly in the classrooms.

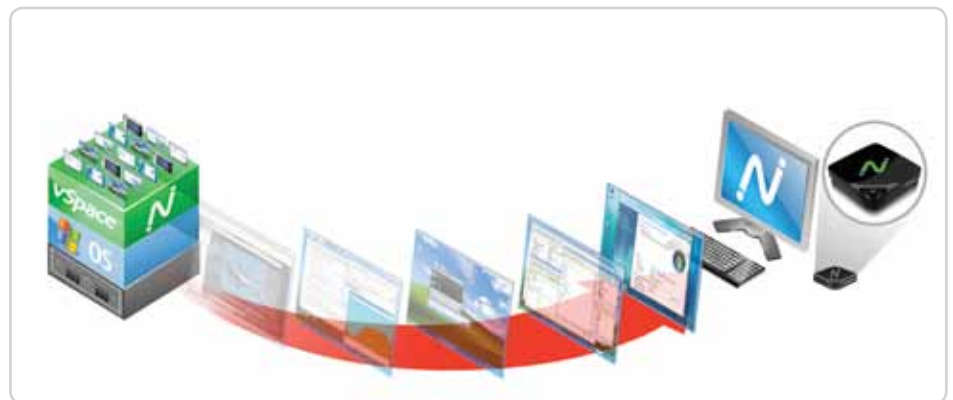
NComputing's desktop virtualization solution offers IT staff and educators a proven way to provide wide-scale computing access throughout the school while keeping capital and support costs in line.

NComputing Virtual Desktops

The concept behind NComputing virtual desktops is simple: today's PCs are so powerful that most people only use a small fraction of its power. Desktop virtualization enables a single PC to be "virtualized" (or shared) by many users – with each user getting his/her own computing session. Depending on the configuration, a single PC can host from 2 to 31 simultaneous users. The NComputing solution has three components:

1. Access devices that connect the user's monitor/peripherals to the host computer
2. vSpace™ software which virtualizes the host computer to create multiple sessions
3. User eXtension protocol which transmits the data and video signals between the user and the host computer.

By combining these three components into a seamless, integrated solution, NComputing delivers a full-motion, no-compromises user experience.



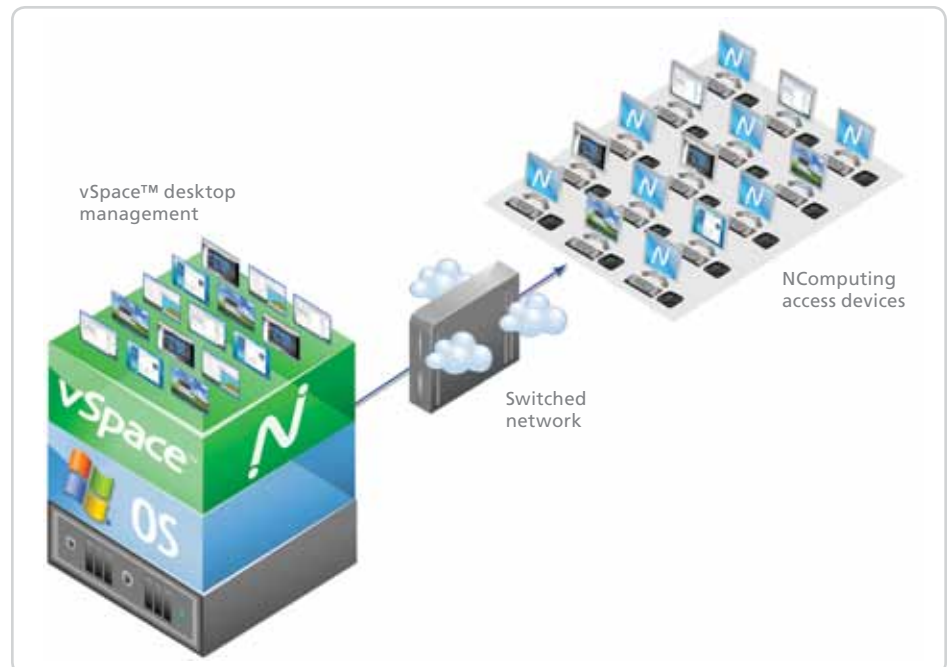
The NComputing solution streams desktops from a server to an access device and allows many users to share a single operating system.

1. Access devices

NComputing access devices are small, low-power, durable boxes that can be mounted on the back of the user's monitor or under the desk. The access devices have ports for the user's peripherals (such as monitor, keyboard, and mouse) as well as the port to connect to the host PC. The access devices do not use PC-based processors or run a local operating system so they use very little electricity (fewer than 5 watts). There are three types of access devices: the L-series, the X-series, and the U-series.



The L-series access devices connect through standard Ethernet networks and up to 30 virtual desktops can be connected to a host PC. Since they connect over standard Ethernet, the user can be practically any distance away from the host computer.



The X-series connect directly to the host PC through a PCI card (included) which is installed into the host PC. Up to 10 X-series devices can be connected to a host PC. There is a 10 meter (30 feet) distance limit between the X-series device and the host PC.



Finally, the U-series connects directly to the host PC's USB port. Up to 10 U-series devices can be connected to a host PC with a 10 meter (30 feet) distance limit. USB repeaters can be used to further extend the user computing stations if needed.



2. vSpace desktop virtualization software

NComputing vSpace software (CD included with the access device) loads on the host PC and virtualizes the PC so that its resources are efficiently divided to support many independent virtual desktops. vSpace was optimized to work with NComputing access devices and UXP so each user gets a rich, full multimedia PC experience. vSpace includes:

- Centralized management: The vSpace management console is easy to use and requires no special training. The console sets up, configures, and manages shared computers and access devices.
- Broad peripheral support: Unlike traditional thin-client solutions, vSpace can manage a wide range of peripherals from speakers and microphones to USB storage devices and printers.
- Flexible networking: Virtual desktops connected to the host PC share that host PC's IP address. For software applications that need a unique IP address for each user, the vSpace NIU (NComputing IP Utility) can provide virtual IP addresses to each user.

3. User eXtension Protocol (UXP)

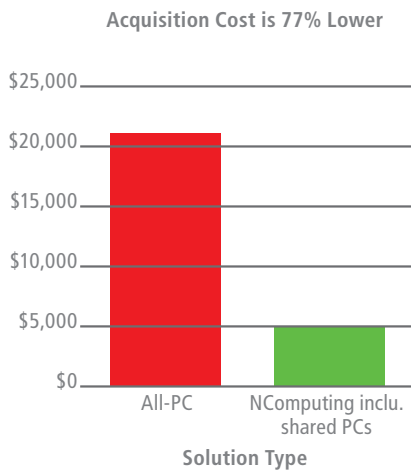
UXP provides the communication link between vSpace and the access devices and is a key reason why NComputing is uniquely able to deliver a rich, multimedia computing experience. Whereas traditional thin clients use protocols developed for occasional use by administrators, UXP was designed for continuous use by end users demanding a full PC experience. UXP supports multimedia applications including streaming video, Flash, and 3D graphics.

Selected by 25,000 schools

NComputing virtual desktops have been selected by nearly 25,000 schools. Over 12 million students, faculty, librarians and administrators use NComputing every day in urban and rural schools, in public and private schools, in large and small districts. These schools have all realized tangible and measurable benefits by deploying NComputing.

75% acquisition/capital cost savings

The most attractive benefit of NComputing is clearly its low cost. The NComputing solution starts at about \$70 per seat (compared to \$700 or more for stand-alone education PCs). Even with the additional cost of peripherals and licenses, most districts can save 75% on upfront acquisition costs alone. A 30-seat computer lab example below compares the purchase costs of an NComputing X-series solution to a traditional “all-PC” deployment. An all PC computer lab would cost \$21,000 while an NComputing-based lab would cost less than \$5,000.



Assumptions: Intel Core 2 Duo with 4 MB RAM PC included keyboard/mice, no monitor. If new monitors are required, same cost would apply to both scenarios.

30 Seat Computer Lab Acquisition Cost Comparison

Acquisition cost of an all-PC deployment (30 PCs @ \$700 ea.)	\$21,000
Acquisition cost of an NComputing deployment consists of:	
– 3 Host PCs (@ \$700 ea.)	\$2,100
– 27 X-series access devices (@ \$70 ea.)	\$1,890
– 27 keyboards & monitors (@ \$15 per set)	\$405
– 27 additional end-user CAL/TSCAL licenses (@ \$20 ea.)	\$540
Total acquisition cost of an NComputing deployment (including host PCs):	\$4,935
Dollars saved with NComputing:	\$16,065
Percentage saved with NComputing:	77%

Schools with older facilities that require networking and electrical retrofits can save even more on installation costs by using the NComputing X-series and U-series access devices. These devices connect directly to the host PC so no additional networking equipment or connections are required. As long as the host PC has a network connection, all of the users plugged to that host PC will also have network connectivity. A 30 station computer lab can be built with just three network drops and no additional networking equipment.

“With our budget it would have taken us years to replace close to the 240 computers we needed across the district.”

TRACY SMITH,
DIRECTOR OF TECHNOLOGY FOR
FREMONT JOINT COUNTY
SCHOOL DISTRICT

75% support cost savings

NComputing not only lowers upfront acquisition costs, but also support costs like installation, maintenance, and replacement.

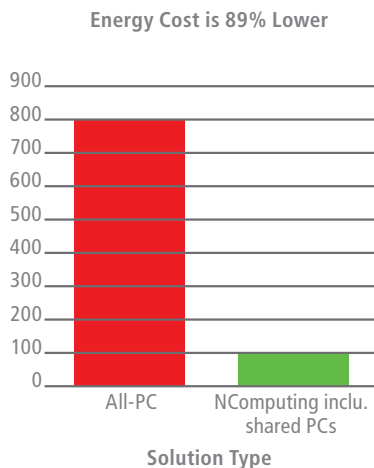
Installation time is dramatically reduced because there are far fewer PCs to image and install. An 11-student classroom can be set up in as little as two hours because only 1 PC is needed. A 30-seat computer lab can be set up in a day because only 3 PCs are needed. The NComputing access devices connect to peripherals and host PC in just minutes. Compared to a traditional all-PC deployment, installation time can be reduced by 60-80%.

Maintenance costs are reduced simply by the fact that there are far fewer PCs to manage. A PC technician can now support many more end users and computing stations.

Replacement costs are also sharply lower when it is time to replace the PCs. Even though schools would like to replace their PCs every 3-4 years, the reality is that its most schools can only afford to replace PCs every 6, 7, or even 8 years. The old PCs result in added support costs, down time, and inability to run the latest software. With NComputing, the PC refreshment cycle can be compressed because only a few PCs need to be replaced. Continuing with the 30 seat computer lab example, only three PCs (not 30) would need to be replaced. The rest of the lab infrastructure (NComputing access devices, monitors, peripherals) can stay put as it has a much longer lifespan. Now the power and capability of the new PCs will be available to all 30 students much sooner.

90% energy savings

NComputing access devices only draw between 1 to 5 watts of electricity. A typical PC draws 110 watts (or more) of electricity. By replacing rows of electricity-hogging PCs with energy-sipping NComputing access devices, schools can save up to 90% on electricity costs. Using the same 30-seat computer lab example, the chart below compares the electricity usage and annual costs. With NComputing, the computer lab would save \$720 per year in electricity cost – an 89% reduction compared to an all-PC lab.



Assumptions: Computer lab operates for 8 hours a day, 200 days per year. Electricity rate: 15 cents per KW/h (U.S. average). Actual rates may be higher or lower depending on local utility rates.

30 Seat Computer Lab Annual Energy Cost Comparison

Energy consumption of an all-PC lab (in kilowatt hours)	5,280
Energy cost of an all-PC solution (in \$)	\$808
Energy consumption of an NComputing deployment (including host PCs) in kilowatt hours	571
Energy cost of the NComputing deployment (including shared PCs)	\$87
Reduction in energy consumption in kilowatts hours	4,709
Reduction in energy consumption (compared to all-PC):	89%
Annual electrical cost savings when NComputing is deployed:	\$720

In addition to the direct electricity savings shown above, schools can also reduce their air conditioning costs by deploying NComputing. This is especially relevant for schools in warmer climates where air conditioning is a major operating expense. A typical PC generates 375 BTU/hour of heat (about the same heat as two 60-watt light bulbs). NComputing access devices generate almost no heat (less than 4 BTU/hour). When multiplied by thousands of computers in a district, the air conditioning impact can be substantial.

NComputing's energy saving technology has been implemented by many schools to support green computing initiatives. For example, the Lindsay Park School in British Columbia, Canada replaced 28 old PCs in their computer lab with four Energy Star PCs and NComputing access devices to create a quieter, cooler computer lab with a small carbon footprint. As part of the school's green initiatives project, the students offset the remaining carbon emissions by planting 100 trees. The net result was the first zero carbon-footprint computer lab in Canada and recognition from the British Columbia government.

The acquisition, support, and energy savings from deploying NComputing are tangible and measurable. Most school districts get a positive return on investment in the first year just from the acquisition and energy savings. In addition, there are other benefits that NComputing delivers to schools that may not be as quantifiable, but are possibly even more important.

Improve educational outcomes and ergonomics

Most schools do not have the funds or the physical space to provide wide-scale computing access in the classroom itself. The school will typically have a computer lab and a few computers in each classroom. As a result, students have limited computer resource time and the faculty can not integrate technology with learning.

By enabling wide-scale computing access in the classroom, NComputing can help enrich student learning. A 25-student classroom can repurpose a few existing PCs and provide 10, 20, or even 25 computer stations for a fraction of the cost. Now technology and teaching are not two separate activities. Students have computer access when they need it, not when it is available. With NComputing, the PC may be shared, but not the computer session.

NComputing virtual desktops are ideal for school-wide computing because their compact size can greatly improve the often cramped work spaces in classrooms, libraries and computer labs. The access devices are about the size of a paperback book and can be unobtrusively mounted on the back of a monitor or bolted under the desk. This frees up valuable desk and knee space and provides the students with a more comfortable work area. Limited classroom space can now be better utilized to provide more computing stations in the same space. And since the devices are silent (no fans/processor noise) and generate almost no heat, the work area is quieter and cooler.

NComputing in schools

NComputing's low-cost, minimal maintenance, and small footprint means it can be deployed at all grade levels. Elementary schools, middle schools, high schools, and special education facilities have all deployed NComputing virtual desktops.

Classrooms

In elementary and middle schools, NComputing virtual desktops are ideal for cramped classrooms. Depending on the teacher's classroom preference (and the physical dimensions of the room), several placement scenarios are possible.

NComputing allows schools to grow the size of their computer labs exponentially, thereby enabling better formative assessment using online technologies.



IT administrators can deploy a computer lab using virtual desktops at 1/3 the cost of a traditional computer lab.



New Zealand school slashes truancy rates

Challenge

Engage disinterested students using computers with a limited budget and a limited number of PCs.

Solution

Deploy NComputing X-series virtual desktops to triple computer access at a very low cost.

Impact

Reduced truancy rates from 30% to 10%. With the school now able to provide one computer for every two students, the students showed much more interest in class work.



Glenavon students enjoy computer access in the classroom using NComputing.

In high schools, NComputing can be deployed in general classrooms as well as science labs and vocational training facilities like computer aided design.



An NComputing computer lab with a 10:1 user-to-PC ratio would only require three PCs.

Computer labs

Computer labs can be easily built, upgraded, or expanded by using NComputing virtual desktops. If a computer lab needs to be built in an existing facility, then using NComputing will significantly reduce networking equipment and installation costs. For example, a 30 seat computer lab using an all-PC deployment would require 30 network drops. An NComputing computer lab with a 10:1 user-to-PC ratio would only require three PCs.

Upgrade existing computer labs

If a computer lab already exists, then upgrading it with NComputing is a snap. Using the same 30-computer station example, upgrading the lab would simply involve replacing 30 PCs with just three new PCs. Depending on the age of the monitors and peripherals, they can either be reused or replaced. The lab can be upgraded in a few hours instead of days.

Expand computer labs

Existing computer labs can easily accommodate more computer stations by using NComputing. The space-saving virtual desktops enable more students to be accommodated in the same space. And existing desktop PCs can be used to support the additional computing stations so the only incremental costs are for NComputing gear, monitors and peripherals.

“It took just four hours to set up the entire computer lab. And ongoing maintenance is easy because we only have to look after four machines in the lab, instead of 28.”

DAVE HLADY
IT SPECIALIST AT ROCKY MOUNTAIN
SCHOOL DISTRICT #6



Lindsay Park students in Canada’s first carbon-neutral computer lab.

Libraries and learning centers

Student demand for Web-based research and productivity applications (word processing, presentations) continues to explode, but libraries have limited space. NComputing can expand the number of computer stations by using the existing space and PCs to accommodate more computer access points. In addition, the silent NComputing access devices ensure a quiet work area for the students and librarians.



NComputing access devices are solid-state and contain no moving parts such as fans. This ensure a quiet work area for students and librarians.

Rural Idaho school district supports large area with limited resources

Challenge

Increase computing access across all Fremont County schools without purchasing additional computers, or upgrading existing workstations. Maintain more computers across a large geographic area.

Solution

Upgrade and expand access using the NComputing X-series to extend each computer to accommodate four or seven users at a fraction of the cost.

Impact

Allowed the district to keep all of its computer labs up to date and added at least three computers in every classroom. The X-series also saved the district money on maintenance and electricity and required fewer computers to be replaced each year.



South Fremont High is one of nine schools in the district.

Administrative areas

NComputing virtual desktops are also a great fit for the administrative areas of a school or district office. Interestingly, administrative staff's computing activities (e.g., email, office productivity, ERP software) are typically less resource-intensive than student computing (full-motion video, Flash, audio). NComputing can be deployed in finance, operations, purchasing, and almost any other area where traditional PCs are deployed.



NComputing virtual desktops are a great fit for the administrative areas. Employees love the extra desk space, the silent operation, and the fast boot time.

Online testing

Many school districts and states are beginning to administer formative and high-stakes assessment tests online. Although many assessment vendors offer online testing options, adoption has been limited due to a lack of computing access. NComputing eliminates this challenge by providing schools and states with a low-cost means to ramp up the number of computers needed to administer online assessments at 1/3 the cost of a traditional offering.

Online scoring

Online assessment scoring is an integral part of the assessment process. NComputing allows schools, districts and states to rapidly deploy scoring centers to locally store administered assessments. This ensures faster turnaround time and provides customers with the ability to create mobile scoring centers on the fly with minimal effort.

Conclusion

School districts face severe fiscal, resource and infrastructure challenges and the situation is unlikely to change soon. With the additional pressure of expanding and upgrading computer access for students and faculty, IT professionals need to deploy computing solutions that are far more cost-effective and require minimal support resources. NComputing virtual desktops can reduce upfront acquisition costs by 75%, ongoing support costs by 75%, and energy costs by 90%. NComputing has been embraced by students, teachers, administrators, and IT staff in over 25,000 schools for their computing needs.

