



**WYSE**  
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## Kool Smiles Dental Care

## Case Study

### Kool Smiles delivers quality dental care for less with Wyse thin clients

#### Challenge: Providing quality dental service to underserved communities

Kool Smiles is on a mission: to provide high-quality dental care for families in underserved communities. But to succeed, the organization needed to overcome the challenges that discouraged dentists from setting up practices in those areas. Compared to other communities, residents have worse dental health, and many depend on government assistance programs, which offer lower payments for dental care than private insurers.



From Kool Smiles' inception, the success of the organization depended on using technology to ensure excellent quality care and drive down the costs of service. The company adopted an innovative approach that leverages electronic dental records, standardized processes, and cost-effective, low-maintenance computer hardware to enhance staff productivity and keep capital costs down.

Kool Smiles' success makes the company an inspiration for other organizations that are seeking to cut costs or implement electronic health records. With its superior scheduling, workflow, and records management capabilities, Kool Smiles employees are able to do more in less time, making it possible and cost-effective for the dentists to provide care for families covered by

Medicaid and State Children's Health Insurance Programs (SCHIP), in addition to serving patients with commercial insurance plans. Each day thousands of children and adults receive dental care previously unavailable to them through Kool Smiles' local network providers.

#### Viewpoint

“We knew we'd need to hold down the expense of supporting our IT infrastructure, and with Wyse, we struck gold. Thin clients have helped us optimize the productivity of our staff, and saved us huge sums we'd otherwise have had to spend on hardware, software, and support for PCs. They also helped us to start small and scale our systems to match our rapid growth, without incurring major expense or requiring painful transitions.”

MARK BLOMQUIST  
CHIEF TECHNICAL ARCHITECT  
AND CO-FOUNDER OF  
KOOL SMILES.



General Dentistry for Kids





## Solution: Thin Computing

Kool Smiles' leadership team had a vision that went far beyond building one or two successful practices. They sought to design an organization that could scale to provide dental services to underserved communities across the U.S., and began by defining the qualities they would need from their technical infrastructure: reliability, security, scalability, and low total cost of ownership (TCO).

Reliability helps doctors and hygienists work without being slowed or disrupted by technical problems, maximizing their productivity. Security enables the company to meet the data protection requirements of HIPAA. Scalability supports the company's plans for growth, from 20 to 25 workstations to several thousand within a few years. And low TCO is integral to the entire plan: by maximizing the company's return on capital expenditure and minimizing its need for maintenance, Kool Smiles can keep its costs low enough to sustain and grow its business.

With the help of Wyse, Kool Smiles developed and deployed an IT-based system for highly cost-effective records storage, care provision, and administration. "Only the thin-client model met our needs for reliability, security, scalability, and low TCO," says Mark Blomquist, chief technical architect and co-founder of Kool Smiles. "It enables us to manage everything in the data center so users can't interfere with the smooth running of applications. Plus, thin clients don't store any data, helping to ensure security. We can plug in hundreds of thin clients before we need to scale server resources. With no time spent setting up or fixing individual machines, we can keep both our administrative and our hardware expenses extremely low despite rapid growth."

## Wyse: Key to the success of Kool Smiles' business plan

Kool Smiles' business model is unique in the dental services field. The company couldn't buy a practice management system that would scale to its projected size. As a result, it had to develop its own. Now several thousand dentists, hygienists, and front-office staff work on Kool Smiles' proprietary practice management application using Wyse thin-client devices. The Wyse thin clients also support Microsoft Outlook and Exchange for email, Microsoft Project for personal productivity, and Internet Explorer for web browsing.

At Kool Smiles' class-one data center in Atlanta, Citrix XenApp 4.5 runs on a load-balanced centralized server farm with approximately 60 servers, delivering applications to approximately 2,100 Wyse V30L and Wyse V90L thin clients at offices across the country. Wyse Device Manager helps IT staff manage device policy, configuration, and assets in real-time, and provides remote imaging, optimization, and administration delegation. Kool Smiles uses VMware for cost-effective running of back-end infrastructure including web servers, monitoring systems, task servers, and Wyse Device Manager.

In reception areas, call centers, and administrative offices, most employees work on V30L thin clients running Windows CE. Front-office and call-center staff use the practice management application to handle scheduling, insurance, and workflow. Accounting staff at two centralized support offices use thin clients for a variety of back-office tasks, including electronic data interchange (EDI) to exchange information and payments with government agencies and intermediaries.

Each examining room has a Wyse V90L thin client with dual LCD monitors running Microsoft Windows XP embedded. Doctors and hygienists use these more powerful devices so that they can run two applications on a split screen, simultaneously viewing x-ray records and medical information including teeth charts. The system helps them chart patient care, file treatment plans, and manage authorizations.

"Every office is laid out the same way, and every type of device works in exactly the same way," says Blomquist. "Our providers can readily move between locations, substituting for staff who are on vacation or sick. This helps maximize the number of patients we can serve in a day."

## Solution

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## Time savers

“We’ve done everything we can on our fat-client environment: bought high-quality workstations, locked down and standardized configurations, and put on anti-spyware, anti-virus, and content filters,” comments Blomquist. “Still, we see about two days of downtime annually on a typical fat client and less than one hour on a thin client.”

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By standardizing its office design and deploying thin clients, Kool Smiles can set up a new office rapidly and inexpensively. IT teams can get a large office with 20 examining rooms set up and ready for business in just a few days. This time savings is especially important to the fast-growing company: Kool Smiles opens a new office once every two weeks, on average.

Kool Smiles rarely needs the services of consultants or specialists. Blomquist says that Kool Smiles has turned to Wyse consultants for help with specific issues, such as optimizing the Wyse Device Manager. But apart from such transitions, Kool Smiles hasn’t needed any assistance with Wyse products. “Our Wyse infrastructure mostly runs itself,” says Blomquist.

## Wyse cuts costs, improves efficiency for Kool Smiles

In addition to meeting Kool Smiles’ initial requirements for reliability, security, scalability, and lower cost of ownership, its Wyse-based IT system has improved continuity of care for patients, optimized staff productivity, and even saved the company on energy costs.

ROI Factor	ROI Calculation	Annual Cost Avoidance
Avoiding additional IT hiring	10 full-time employees @ \$45,000 each	\$450,000 fully loaded
Lower electricity consumption	Up to 102 watts saved per thin client/hour	214.2 kilowatts company-wide per hour of operation
Lower cost to provision thin client vs PC	\$1,000 per thin client; \$2,000 per PC	\$1,000 for each workstation set up
Less maintenance	Each PC or laptop typically costs \$600 in maintenance services annually and is down for 2 days a year, with less than one hour downtime for a thin client	Multiplied by 2,100 thin clients this means savings of \$1.26 million in maintenance visits and 31,500 hours of downtime avoided
Fewer replacements	Thin clients last 5 years instead of 3	Reduce hardware replacement frequency by 60%

## Reliability

Compared to PCs, thin clients deliver much more consistent performance and reliability, for many more years. “We’ve done everything we can on our fat-client environment: bought high-quality workstations, locked down and standardized configurations, and put on anti-spyware, anti-virus, and content filters,” comments Blomquist. “Still, we see about two days of downtime annually on a typical fat client and less than one hour on a thin client.”

Thin clients have no spinning disks or fans to break. Users cannot add or change applications or the desktop, so thin clients rarely develop software problems. When a machine does need attention, Wyse Device Manager allows IT staff in Atlanta to manage it remotely, without the need to travel or support IT staff at each site. The team can reboot or reflash applications to the device from a distance. And with a spare thin client in most offices, there are no delays due to a problem with a thin-client device. Staff can just plug in the spare and resume work.





## Less expensive

“I can support 110 to 120 users on an enterprise class 1U server and the whole system remains well load balanced to deliver sub-second response times. High-quality computing just doesn’t come less expensive than that.”

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## Security and compliance

Kool Smiles must comply with HIPAA requirements to protect all private health care information, so its systems implement several layers of security. The company uses a carrier-class virtual private MPLS network from Qwest to move data around and between its offices via a secure data stream. Citrix encrypts data that it projects to thin clients. All the USB ports on the network are centrally disabled, so users cannot connect additional devices and download data to them. Because data does not reside on the thin clients, even if a thin-client device was stolen, patient confidentiality would not be affected.

In addition to complying with government security requirements, Kool Smiles must also respond to regulators and auditors who want to check dental records and treatment plans to ensure quality of care and financial accountability. With all records in electronic form, staff can simply provide system access to regulators and let them view the data instead of spending time pulling up files to answer regulators’ questions.

## Scalability

Kool Smiles’ model of Wyse thin clients and Citrix XenApp has proven its ability to scale up rapidly and cost-effectively to meet the needs of the business. “Instead of scaling up by buying a bigger server, we can grow in a more granular way by scaling out,” says Blomquist. “I can just decommission the 10 slowest of my existing servers, put in faster commodity servers for better price and performance, and gain another 30% capacity—all for minimal investment and with no disruption to users on the system. This way, we’re not paying for capacity that we don’t yet need. And we don’t need to take time out for a transition, because it’s easy to move data among these servers.”

As for the Wyse thin clients themselves, they don’t need to scale at all: they don’t have operating systems or applications that would need individual upgrading or expanding. Scalability is as simple as plugging in another thin-client device.

## Low TCO

Providing a user with a dual screen thin client costs about \$1,000, which includes hardware purchase, set up, and connection to a server. To get a PC up and running would cost about twice that amount. But, unlike a PC, the thin client will probably last at least five years instead of three—and will need no hands-on maintenance. Blomquist estimates that overall, including cost savings for hardware, reduced obsolescence, reduced hands-on maintenance and administrative simplicity, each thin client costs approximately one-fifth of a PC over its lifespan—and virtually eliminates loss of productivity associated with PC problems.

On the server side, Blomquist is delighted with the price/performance of running thin clients from the data center. “We can support each user on the server side for just \$40 to \$50 each not including software licensing,” he says. “I can support 110 to 120 users on an enterprise class 1U server and the whole system remains well load balanced to deliver sub-second response times. High-quality computing just doesn’t come less expensive than that.”

Kool Smiles’ low TCO isn’t just due to hardware savings; it’s also a result of reduced IT administration costs. Blomquist estimates that one technician can support 65 to 70 laptop users, or 150 desktop users, or 500 thin client users. By using 2,100 thin clients instead of PCs, Kool Smiles needs only about 4 staff to support its environment instead of 14. And with each administrator costing the company approximately \$45,000 a year, that means the company is saving approximately \$450,000 per year in administrative expenses.





## Continuity of care for patients

A patient can come into any Kool Smiles office, and the doctors, hygienists, and front-office staff can immediately pull up all that patient's records from the central data center in Atlanta. The call center, too, has complete visibility into patient behavior, history, and insurance, enabling consistent follow-up and reminders that ultimately improve patients' dental health.

Electronic records also enable Kool Smiles to mine patient information in a way that just wouldn't be possible with paper charts and images. "All our data is electronic and stored in one central location, so we can readily run analyses on it, for example to find out what characteristics lead to someone not showing up for their care," says Blomquist. "Our call center reminder system works with that information to generate direct mail and phone calls to bring patients back on schedule. This is a win-win: it helps us succeed as an organization focused on providing excellent dental care, and it helps our patients improve their dental health and avoid serious and painful problems."

## Staff productivity

Kool Smiles' system enhances productivity by providing authorized staff access to all the information they need, wherever they might be. With Wyse thin clients and standardized office layouts, doctors, hygienists, and other employees can hit the ground running in any Kool Smiles examining room or office building, to cover for employees who are out sick or on vacation. This makes more staff available for emergency appointments and virtually eliminates cancellations due to dentist absence, which improves patient service and lowers cost.

Kool Smiles' centralized electronic dental records also help boost staff productivity and quality of care in several ways. First, they help the company perform ongoing auditing, in which the company's experts pull up records at random and examine them to ensure patients are receiving consistent quality of care. They also make it easy for dentists to consult with any other dentist in the company. Two doctors can pull up the same files and discuss the case over the phone, no matter how far apart they are. This way, Kool Smiles can ensure that every patient is able to benefit from the company's most expert specialists.

## Energy

With energy costs headed up, Kool Smiles is saving money by keeping its energy use low. Thin clients typically consume 6 to 15 Watts (W) each, while conventional desktop PCs consume an average of 85 to 110 W. Add in the prorated portion of the server operation and data room cooling, and a thin client consumes 8 to 22 W. Multiplied across 2,100 thin client devices, the company is achieving energy savings of between 132.3 to 214.2 kilowatts per hour of operation.

## Low admin cost

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## Summary

### Customer:

- Kool Smiles
- Network of local dentist offices across 15 states

### Challenge:

- Provide dental care for underserved communities
- Maximize staff efficiency for consistently excellent care
- Minimize IT costs to support reinvestment

### Solution:

- Centralized thin computing environment with Wyse V30L and V90L thin-client devices connected to Citrix XenApp centralized application servers
- Centralized infrastructure management with Wyse Device Manager software

### Results:

- Maximized administrative efficiency by enabling each IT person to support 500 users instead of 100
- Increased quality of care through electronic records and automated follow-up
- Supported company growth by holding down costs of IT to one-fifth of comparable systems.

## Conclusion: Delivering better dental care, for less

By any measure, Kool Smiles has been a success. People in underserved communities are now getting high-quality dental care, complete with follow-up and preventative care.

“We can measure our success in the changes that take place in our communities,” says Blomquist. “After we’ve been in a neighborhood for several years, we see fewer people who need restorative and operative dentistry, and more people coming in for preventative care.”

Delivering quality dental care at low cost has allowed Kool Smiles to support its growth and offer services to even more communities. “We knew we’d need to hold down the expense of supporting our IT infrastructure, and with Wyse, we struck gold,” says Blomquist. “Thin clients have helped us optimize the productivity of our staff, and saved us huge sums we’d otherwise have had to spend on hardware, software, and support for PCs. They also helped us to start small and scale our systems to match our rapid growth, without incurring major expense or requiring painful transitions.”

“The financial challenges of serving disadvantaged communities make it impossible for most dental practices to operate there,” says Blomquist. “But with Wyse thin clients dramatically enhancing productivity and reducing our costs, we’ve turned the challenge into an opportunity and have both built a thriving business and improved the dental health of thousands of people.”

## Solution Architecture

### Clients

Wyse V30L and V90L

### Management Software

Wyse Enterprise Device Manager v4.7, Dell OpenManage

### Applications

Proprietary Dental Practice Management,  
Microsoft Office/Exchange & Sharepoint

### Servers

(60) Dell PE2950, PE1950s and SC1435s

### Network

National T1 MPLS Network with end-to-end QoS

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