



## Harvard Medical School

### InfraStruXure® Design Prevents Small Issues from Becoming Big Problems

"Our IT staff is tasked to deliver scalable, cutting-edge technology applications 24x7x365. One area that we've focused on has been the standardization of our IT infrastructure. We have determined that a standardized approach to technology deployment helps to reduce human error, allows us to detect the root cause of defects, and creates shared learning across the organization.

"We performed a thorough assessment of available power, rack, and cooling solutions. Most of the solutions we investigated were comprised of a series of unique 'point' products, manufactured by multiple vendors, and not designed to work together. These traditional systems are capable of alerting us to faults only after the damage is done. In addition, we found that support for these traditional solutions requires a heavy dependence on outside specialists.

"With the InfraStruXure system, we immediately receive alerts over the network if a threshold is exceeded, and the system identifies, on its own, exactly where the fault is occurring. InfraStruXure was the only system we encountered whose fundamental architecture was based on pre-engineered and pre-tested building blocks designed to work in a truly integrated fashion."

"The InfraStruXure® system has far exceeded our expectations. Now that I look back, I don't know how we ever operated without it."

—John Halamka, CIO  
Harvard Medical School

Get more information on APC by Schneider Electric solutions at [www.apc.com](http://www.apc.com)

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# Solutions for Network Closets

Network closets have become mission-critical environments. APC lets you control, monitor, and manage them like never before.



Control the power



Monitor the environment



Manage the cooling



# Control, Monitor, and Manage

## Today's Critical Network Closets Like Never Before

### CUSTOMER PROFILE



**Name:** Rudy Hassall  
**Position:** Director of Information Systems  
**Company Name:** The McGinn Group, Arlington, VA  
**Industry:** Communications consulting  
**Number of Employees:** 47  
**IT Staff:** 1  
**Applications:** VMware ESX Server, Microsoft Exchange, SharePoint, GoodLink, BlackBerry  
**Greatest Challenge:** Remote management

### APC Lets One-Man IT Department Troubleshoot Network Closets Remotely

#### What challenges do you face in managing your power, cooling, security, and environmental monitoring?

I reside 45 miles from the office, and that is an hour lost in troubleshooting time. So, I needed to improve my remote capabilities in case of system outages. We have consistent power issues in our building, and the cost of installing a generator cannot be justified. The heat is definitely an issue, as there is no ventilation system in the room and, as in most commercial buildings, the air conditioning is turned off in the evening and on weekends.

#### What specific issues were you looking to solve?

Longer battery times, cooler environment—and a way to monitor them both. We needed to cool down the room soon or it was going to create more costly hardware failures and issues for us. We had no way to monitor the temperature or power status. We had 5 UPSs that couldn't provide us enough time to shut down properly . . . if I were there! There was no way to manage them remotely.

#### What made the APC solution unique?

It was a one-stop shop for all of my requirements in which all the solutions were integrated with each other. The system is very cost effective because it is scalable and can expand easily as our company grows. And with growth comes the need for power and cooling management.

#### How did APC resolve your issues?

I am now able to centrally and remotely manage our power and cooling equipment.

Read how APC has solved other customers' network closet challenges at [www.apc.com](http://www.apc.com)



Convergence, consolidation, virtualization—today's IT trends have turned the network closet into a mission-critical environment. Network managers now need to deliver traditional telco levels of availability within these "edge of the network" sites.

But unlike other IT environments, network closets are unmanned and infrequently accessed. There aren't staff walking by to check up on things, and issues threatening downtime could well go undetected. Network closets are usually oddly shaped, out-of-the-way places that were never intended to house IT or networking equipment—and certainly not today's high-density networking devices. Such core infrastructure issues as power, cooling, and security were, at best, afterthoughts.

Achieving a highly available network in a space-constrained, out-of-sight location presents several challenges:



#### Control the power

- Know the network's "availability status." Too often no one is aware that there's a problem until after the fact.
- Identify and resolve power issues quickly. Power problems are the biggest single cause of data loss—and are occurring more frequently now than ever.
- Reduce cable clutter and improve accessibility. As racks get packed with more and more equipment, cabling threatens to sprawl out of control without proper cable management.



#### Monitor the environment

- Know what the physical conditions are like inside the network closet. Environmental disruption is the #1 cause of downtime in remote locations.
- Keep networking equipment safe and secure. The combination of unmanned space and distributed assets leaves critical equipment vulnerable.



#### Manage the cooling

- Cool the network closet 24x7x365. Most closets rely on existing building HVAC systems—which operate only seasonally and usually not on weekends.
- Supply sufficient cooling. Today's PoE switches increase power densities. More power means more heat—more than building HVAC systems can handle.

APC solutions give you the level of control, monitoring, and management that today's more critical systems demand. After all, you can't deliver an ultra-reliable network if you don't know there's a problem until after the fact.

# APC Network Closet Solutions: The Next-Best Thing to Being There Yourself

Whether it's dealing with power/cooling issues, keeping tabs on the environmental conditions, or keeping the space secure, APC products give you unsurpassed ability to control, monitor, and manage the network closet—from anywhere on the network. You know exactly what's going on in the network closet without having to be there. You resolve problems without making a site visit. And APC solutions integrate seamlessly with existing building and enterprise management systems, so you can begin remotely controlling, monitoring, and managing your network closet without missing a beat.

## Control power in the network closet without being there

- APC network UPS units with embedded management capabilities alert you immediately of any power events and let you deal with the issue remotely. This integrated management technology allows you to access each UPS from anywhere on the network, to reboot hung servers or reset locked-up switches.
- Available in a broad range of densities, APC switched rack power distribution units (PDU) let you know exactly how much power your networking equipment is drawing. Individual outlet control lets you manage devices remotely, on a component-by-component basis.

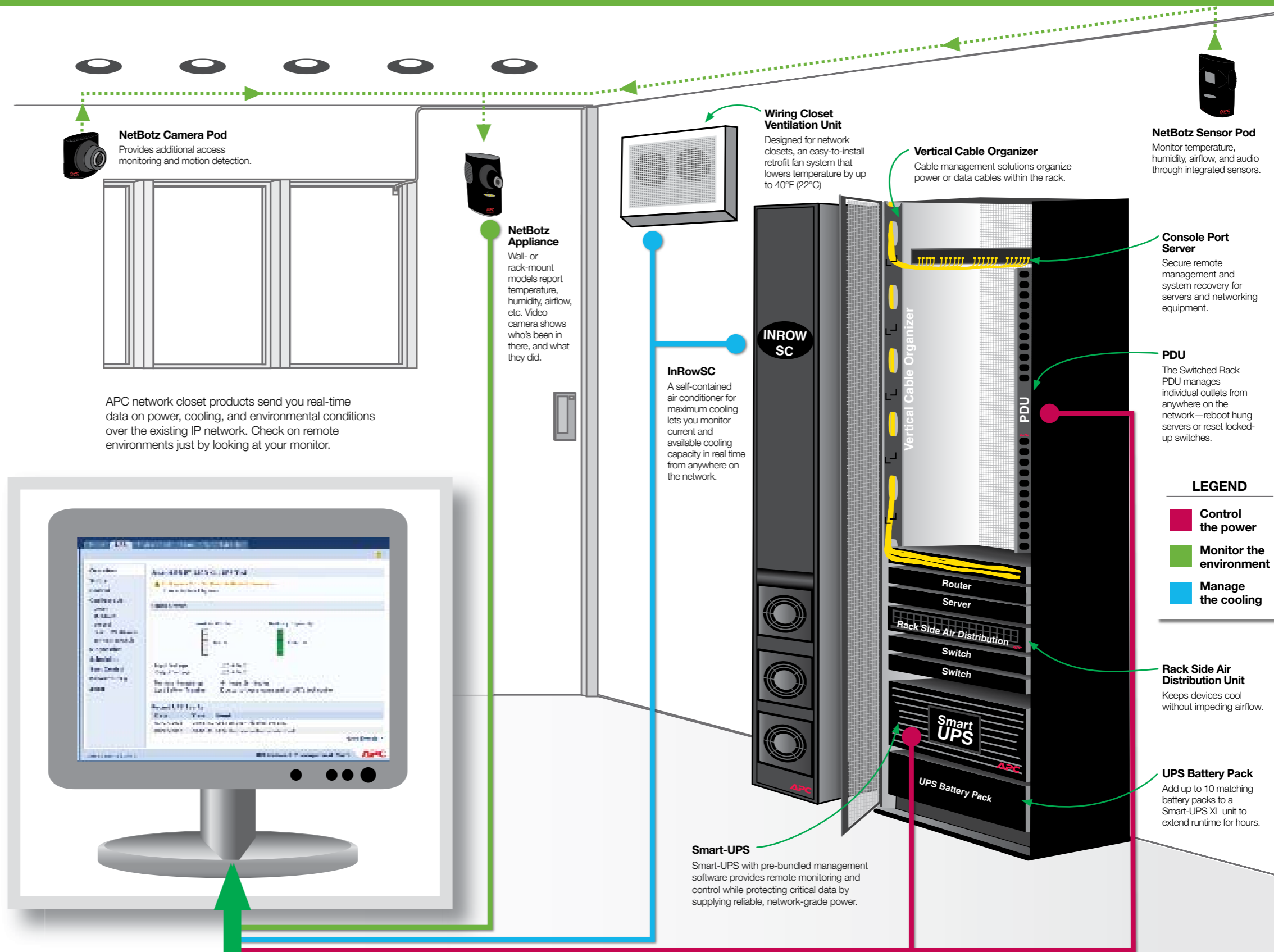
## Monitor the network closet without being there

- NetBotz® monitoring appliances proactively check the vital signs of the network closet environment—everything from the temperature within the closet to water damage to airflow issues. Sensor pods and video cameras act as a surrogate set of “eyes and ears” to warn you of conditions that threaten downtime.
- Integrated surveillance cameras not only provide physical security for your IT assets but allow you to assess situations via video clips: Is it a burst pipe, or only a spilled water bottle? Did someone move servers or add a new device?

## Manage cooling in the network closet without being there

- Designed specifically for network closets, the Wiring Closet Ventilation Unit can be configured easily for remote monitoring, allowing you to control the unit based on a predefined temperature set point—making it ideal for auxiliary or backup cooling. Or...
- With the APC InRow® SC air conditioning solution, monitor cooling capacity in real time from anywhere on the network. Get up-to-the-second data on inlet temperature, supply and return air temperature, airflow, cooling output and demand, and a dozen other status readings.

Need to manage multiple network closets?  
Check out APC InfraStruXure® Central on p. 7



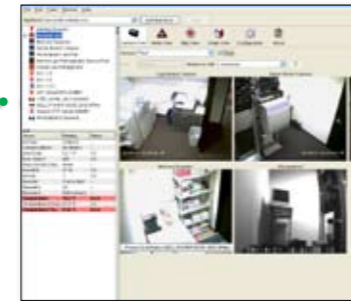
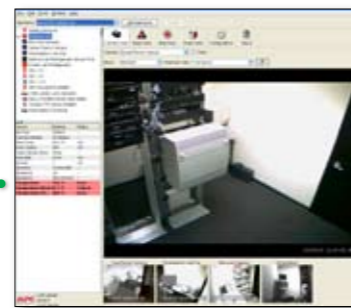
# NetBotz® Monitoring: Your “Eyes and Ears” in the Network Closet

Network closets are by their very nature less-than-ideal places to keep IT equipment. Existing ventilation and air conditioning cannot keep up with the amount of heat generated by higher-density equipment. Sensitive equipment is vulnerable to burst pipes and dust. Security is often nonexistent, so anybody can just walk in and tinker with the deployment.

The NetBotz solution uniquely integrates environmental monitoring and security surveillance. The combination of environmental sensors and video cameras gives you up-to-the-second room- and rack-level information on what's going on in

the network closet. Sensor pods collect data on environmental conditions (such as temperature, humidity, fluid, airflow, vibration, dust, and audio), and full-motion video cameras capture a visual record of who's been in the network closet and what they did there. Integrated software assesses the severity of any physical threat—whether environmental or human—and alerts you via e-mail, phone, or pager.

As your on-location “eyes and ears,” NetBotz monitoring and surveillance products keep tabs on your network closet when you're not there and proactively warn you when there's a problem.



NetBotz automatically alerts you of potential problems via e-mail, phone or pager.



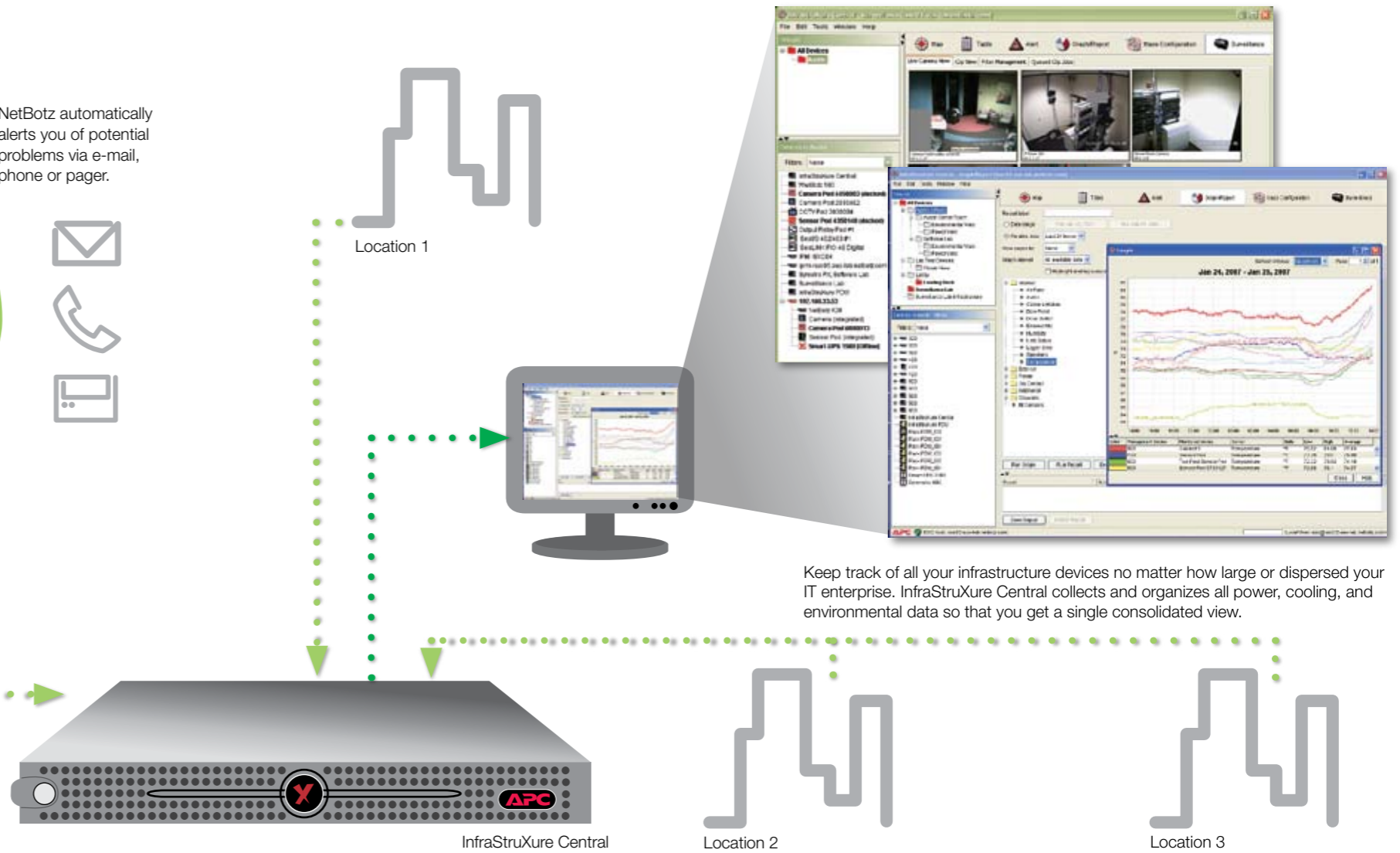
Receive proactive alerts—environmental or human—in the network closet put availability at risk. Integrated video clips let you actually see what's going on.

# The Enterprise Network Closet: Centralized Supervision of Multiple Sites

If you need to manage multiple IT environments simultaneously, InfraStruXure® Central is data management software that offers a way to efficiently control, monitor, and manage all your enterprise-wide physical infrastructure devices. In essence a centralized clearinghouse for all power, cooling, and environmental data, the InfraStruXure Central appliance gives you a consolidated view of this information in one place, visible from anywhere on the network. Configure the appliance to warn you when conditions somewhere along the network threaten availability. The collected information can be viewed from multiple consoles running on multiple systems,

but you can set access privileges to allow different users from different departments to view and analyze data as needed.

InfraStruXure Central scales easily to accommodate growing or additional IT environments, supports any SNMP-compliant device regardless of vendor, and offers sophisticated reporting and trending capabilities. When your IT environment is simply too large, too spread out, or too complex to control, monitor, and manage on a component-by-component level, InfraStruXure Central goes out and collects the data you need—and presents it in a way you can use.



Keep track of all your infrastructure devices no matter how large or dispersed your IT enterprise. InfraStruXure Central collects and organizes all power, cooling, and environmental data so that you get a single consolidated view.

# Recommended Solutions for Typical Customer Scenarios

	Standard-density environment UPS-level environmental monitoring	High-density environment Network closets & small IT rooms	Ultra-high-density environment Centralized monitoring of multiple sites
<b>Rack</b>	<b>NetShelter® SX 24U enclosure</b>	<b>NetShelter® 4-post open frame rack</b>	<b>NetShelter® SX rack enclosure</b> • 42U/48U x 600mm/750mm x 1070mm/1200mm
<b>PDU</b>	<b>Basic Rack PDU</b> • Expand the network closet power capabilities to handle varying voltages, different densities	<b>Metered Rack PDU</b> • Manage power at the rack level with pinpoint control • Monitor power draw	<b>Switched Rack PDU</b> • Monitor power draw & control outlets remotely
<b>UPS</b>	<b>Smart-UPS® XL 750–3000VA</b> • Scalable runtime • Add up to 10 extra battery packs  <i>* other Smart-UPS models also available</i>	<b>Smart-UPS® RT 1.5–20kVA</b> • Scalable runtime • Rack/tower convertible • Integrated remote UPS management on all models above 3kVA	<b>Symmetra® LX 4–16kVA</b> • Scalable power and runtime • Configurable for N+1 redundancy • Integrated remote UPS management
<b>Environmental Monitoring</b>	<b>UPS network management &amp; environmental monitoring cards</b> • Add-on cards for managing UPS monitoring temperature and humidity	<b>NetBotz® 320</b> • Room-level environmental monitoring • Basic security surveillance	<b>NetBotz® 420 plus InfraStruXure® Central</b> • Room- and rack-level environmental monitoring • Advanced security surveillance
<b>Cooling</b>	<b>Rack Side Air Distribution Unit</b> • Heat removal up to 1.5kW • Airflow of 260 CFM	<b>Wiring Closet Ventilation Unit</b> • Heat removal up to 3kW • Airflow of 475 CFM	<b>InRow® SC</b> • Heat removal up to 7kW • Airflow of 1200 CFM
<b>Extras</b>	<b>High-density vertical cable management</b>	<b>High-density vertical cable management</b>	<b>High-density cable management</b> • Vertical & horizontal options for network applications • Rear channel options for servers

For complete technical specifications and further details on APC products, go to [www.apc.com/products](http://www.apc.com/products)

## Racks

NetShelter® SX 24U enclosure



NetShelter® 4-post open frame rack



NetShelter® SX rack enclosure



## PDUs



Basic Rack PDU



Metered Rack PDU



Switched Rack PDU

## Environmental Monitoring



UPS network management & environmental monitoring cards



NetBotz®



NetBotz® 420 plus InfraStruXure® Central

## UPSs



Smart-UPS® XL



Smart-UPS® RT



Symmetra® LX

## Cooling



Rack Side Air Distribution Unit



Wiring Closet Ventilation Unit



InRow® SC

“All our switches, hubs, and routers are protected by APC units. We experience a lot of brownouts and voltage fluctuations, and I was constantly troubleshooting weird ‘glitches.’ Once I protected the equipment with APC UPSs, the problems went away.”



—Jason Ostrowski  
Operations Manager  
Applied Development Company

“The modular design of the batteries and the ability to monitor everything from the Web browser allows us to catch small problems before they become a big concern.”



—Andy Koostra  
Systems Manager  
Consolidated Utility District

“The APC InfraStruXure® solution distinguished itself based on achieving all our performance characteristics for power, racks, and cooling within the client’s budget. The largest benefit is that this solution ensures a single integrated power management and cooling system that can be managed the same way as the other IP-based systems within the facility.”



—Brian R. York,  
Director Wireless National Practice, Insight

# Power and Cooling Applied Technologies

## Your Next Steps

### APC Network UPSs:

#### Undisputed leader in network power protection

Perfectly suited for the network closet environment, APC UPS models protect networking hardware from damaging surges and lightning, prevent data loss, and boost availability levels. Now available with pre-installed network management so you may monitor and control individual UPS s remotely.

- Hot-swappable, user-replaceable batteries
- Widest breadth of single-phase UPS offerings from 420VA to 20kVA
- Line-interactive, online, modular, or scalable solutions for every customer need or application requirement
- Management options that ensure interoperability across multiple OS and network integration platforms

UPS Network Management & Environmental Monitoring Cards connect your UPS directly to the network without the need for a proxy such as a server. Embedded management technology lets you monitor and control the UPS remotely over the network.

- Reset hung switches/reboot hung servers remotely
- Control group outlets
- Monitor the temperature of the UPS
- Manage each UPS individually from anywhere on the network
- Receive early warning of problems before they become critical



### InRow® SC:

#### Predictable cooling for an unpredictable environment

Get maximum cooling in a minimal footprint. The revolutionary Close Coupled Cooling™ design of this energy-efficient unit captures hot exhaust air directly from the IT equipment—so cooling becomes more predictable. Deploy the self-contained unit rapidly without the need to run refrigerant lines or provide remote heat exchangers.

- Built-in condensate pump ensures continuous operation
- Hot-swappable, variable-speed fans
- Monitor current and available cooling capacity in real time
- Receive predictive fault notification
- Rejects heat up to 7kW



Engineered to work with InfraStruXure®



Need more information on managing, monitoring, and controlling your network closets remotely? Want to explore APC solutions in greater depth? APC online tools, research guides, and online courses give you all the background you need to make informed decisions and smart investments.



#### ■ CHECK OUT . . . APC online resources

APC has developed a wealth of online tools to help you clarify your requirements and explore your options:

- **InfraStruXure® Design Reference Gallery**  
Jump-start your network closet design. View an online portfolio of “reference designs” that match for your specific criteria.

[www.apc.com/products/infrastruxure/designgallery](http://www.apc.com/products/infrastruxure/designgallery)

- **Online Selectors**  
The APC Online Selector Tools cut right to the chase to recommend the products that best meet your needs, saving you time and hassle.

All the Selector tools are accessed via the “Selectors” tab in the top menu bar at [www.apc.com](http://www.apc.com)



#### ■ READ . . . APC Data Center Science Center research

APC has spent \$90 million researching solutions to the most pressing customer problems. Take advantage of more than 100 “must-read” white papers, practical how-to guides, and other thought-leadership publications from the world’s leading R&D center on power, cooling, and physical infrastructure issues.

- Cooling Strategies for IT Wiring Closets and Small Rooms
- Power and Cooling for VoIP and IP Telephony Applications

Browse through the entire APC library of research by going to our Information Center at [www.apc.com](http://www.apc.com)



#### ■ LISTEN . . . Research guides on podcast

The most productive 20 minutes (or so) you’ll spend all week. With dozens of “Tech Talk” podcasts available, listen to the experts discuss the latest solutions to today’s biggest challenges.

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