Power Protection for Storage Solutions

Direct Attached Storage (DAS)
Network Attached Storage (NAS)
Storage Area Networks (SAN)
XIOTech manufactures a centralized, intelligent storage subsystem touted by industry experts as ‘SAN (storage area networking) in a box’. We call it the Magnitude and it is capable of processing speeds in excess of 90,000 I/Os a second, which is 10 times faster than traditional enterprise RAID systems. Customers who purchase these products require rapid and continuous access to data.

"Since power problems are one of the leading causes of downtime, we decided from the beginning to include the APC Smart-UPS® 2200 as part of the standard configuration of our Magnitude product. As an award-winning REDI (Remarkable Efficient Device I/O) Storage Architecture device, the Magnitude allows users to connect their most critical systems to a high-availability, centralized storage sub-system. We have users accessing multiple terabytes of data from NT and NetWare servers.

"Today, as many as eight Intel servers can all share the same storage. In fact, this quarter we will announce connectivity support for hundreds of servers connected to the same storage subsystem, all powered by the APC Smart-UPS. We have installations in large financial organizations, pre-press companies, education, government, and hospitals, and they all rely on APC.

"Now that applications like messaging, Internet servers and E-commerce servers are deemed mission-critical, losing power to the storage is simply not an option. Because our storage is extremely fast and flexible, we integrate into applications requiring high performance and continuous access. Even if you’re only using storage for file/print, downtime still costs you in excess of $27,000 per hour — and that’s just for lost productivity."

"Data access is critical to our customers. Our customers look to us to solve any challenges that might cause them to lose access to their data, including data path failure, drive failure, corrupt data tables, user error, adding storage, zero-backup window and power problems. We can’t assume anything. We recognize that a corporation’s data is the lifeblood of the company. Losing data means losing crucial competitive advantage."

Storage Solutions Demand APC Protection

Data Explosion

Today, businesses realize the true value of their data and the necessity for reliable storage technology. Key drivers of the massive growth in storage demand are the Internet, E-commerce and personalized Web services. It is estimated that by 2003, 75 percent of IT spending will be on storage (IDC).

In the 24x7 Internet world, availability and the prevention of the corruption of data are crucial to your company’s existence. An aging national power transmission grid, electric utility deregulation, weather, and other factors combine to continually threaten the assets of your business.
Your business can’t afford to lose its most precious resource: stored data

APC has multiple solutions for your selected storage architecture. In many cases, you can apply similar strategies you use for server protection. APC Solutions provide:

- **Reliable power**
- **Management including remote, sequenced on/off**
- **Secure environment**
- **Scalability**

Whether your company uses Direct Attached Storage (DAS), Network Attached Storage (NAS), Storage Area Networks (SAN) or a combination of all three, APC solutions can be customized to protect your valuable data and enhance your availability.

**Direct Attached Storage (DAS)**

With Direct Attached Storage, a storage device is connected directly to one server. Other networked servers requiring stored data from that particular storage device must go through the originating server. Currently, DAS is the most popular form of data storage.

**Why Use DAS?**
- Less expensive
- IT departments already know how to work with DAS
- For geographically dispersed servers

**Network Attached Storage (NAS)**

Network Attached Storage is connected directly to the network. All servers can share the data stored on the NAS device, even if they run different operating systems. In the datacenter, people use NAS when they need to add a lot of storage fast. It’s also commonly used in remote closets, when many users on a single LAN segment share data-intensive files.

**Why Use NAS?**
- Easy installation
- For file-serving between servers
- For multiple OS environments
- For remote LAN segments with large storage needs

**Storage Area Networks (SAN)**

Storage Area Network devices are not dedicated to one single server. Rather, these storage devices connect via their own networking equipment (typically a fibre switch). Servers on the LAN access the storage devices via LAN to SAN network connection. Therefore, barring any administrator restrictions, every server on the LAN can access any storage device on the SAN.

As the demand for stored data grows exponentially, management of multiple storage devices on the network becomes a time consuming problem. In a SAN, the servers are connected to a host of storage devices, most commonly through a fibre switch. This way, all of the storage devices are consolidated in one location and can be managed as a single device. There are many industry efforts underway to determine standards for an open SAN, and APC is involved in most of these discussions.

**Why use SAN?**
- Ease of management
- Scalability
- For massive storage deployment
- When data security is important
- For Net traffic management
## Single Server/Storage Device Protection (DAS)

Are you considering DAS, where the storage device is connected directly to one server? Will you be adding storage to a single, on-site rack or to one in a remote, decentralized location? If so, you should start with the basics of protecting both your hardware and the data stored therein.

At the very least, you’ll need battery backup with included surge protection to run through short-term outages and power grade fluctuations. For longer duration outages, you’ll need integrated software utilities, capable of safe system shutdown to protect your vital data from corruption.

Managers of server and storage devices also benefit from being able to monitor, configure, start up, shut down or reboot equipment via Telnet, HTTP or SNMP. Also useful is the ability to monitor the temperature, humidity or physical security of your centralized racks. In addition, all required cabling and connectors should come from a company you trust.
Centralized Server/Storage Protection

If you’re implementing NAS or SAN in a centralized server environment, you’ll need more than single server power protection to ensure your data integrity. Combining all this equipment (perhaps in a few racks or grouped within a closet) requires redundant protection able to handle higher VA power levels.

In addition to software that monitors each UPS and connected accessories individually, you’ll also need more robust inventory management software to keep track of the condition of multiple UPSs and batteries. Doing so gives network managers a more informed view of the entire network’s runtime in case of outage.

NAS Environment

APC Storage Solutions for Centralized Equipment Protection

In addition to the Single Device Protection solutions listed at left, Centralized Equipment Protection includes:

- APC Symmetra® Power Array™ or Rack-Mount: Scalable, redundant power protection for centralized servers, datacenters and high availability applications.
- APC PowerChute® Web Device Manager: Monitoring tool for UPSs and APC MasterSwitches from one central location utilizing a Web browser.
- APC PowerChute® Inventory Manager: APC software application providing a Web-based inventory management and reporting tool for network administrators.

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In addition to the Single Device Protection and Centralized Equipment Protection solutions already listed, Datacenter Protection includes:

**APC Management Platform Integration Software**: APC software that allows users to monitor network components, diagnose problems, and perform proactive maintenance within industry-leading management platforms.

**APC Fiber Cables**: Those utilizing Fibre Channel (FC) and Fibre Channel Protocol for SCSI (FCP) in their Storage Area Network can also count on APC for fiber cables. With the recent acquisition of ABL Electronics, APC is your one-stop shop for storage protection and connectivity.

**APC Silcon® Series 3-Phase UPS**: 3-Phase on-line power protection device with N+1 capability and load capacity to serve a broad range of electrical equipment – from mainframe computers to enterprise-wide installations, production lines, electronic control systems and telecommunication equipment.

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**SAN Environment**

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**Storage Area Network with Datacenter Protection**

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**Datacenter Protection (SAN)**

Should your server and storage equipment power needs exceed a small collection of racks or closets, you’ll require entire datacenter protection. This means uninterruptible power in even higher VA ranges. You can still integrate the software and management accessory features you need in either single-phase or 3-phase solutions.
Only an APC Solution is Scalable and Redundant

You know that the heavier your load, the more you’ll be spending on power protection. And over time, your load will increase. With APC, there’s no need to purchase power protection you won’t need for another year. No one else offers the range of scalable, flexible solutions that APC does. Our scalability lets you purchase only the power protection you need for the size of your current load. As your business grows, our modules grow with you. And for the same cost as other solutions, you can build in N+1 redundancy. With APC, you can spend as you need, saving money and valuable floor space up front.

You choose the architecture to suit your needs: Centralized, Zone or Distributed.

Centralized
A traditional approach for the large, stable business that doesn’t expect the load to change dramatically over time. Choose a UPS with enough headroom to accommodate the expected load. The Silicon family offers a power factor corrected design with the ability to build in N+1 redundancy to your network power infrastructure. Whether your power load requirement is 10kVA or greater than 500 KW, APC Silicon UPS systems offer scalability and redundancy for your business needs.

Zone
The Zone-based power availability solution works well for an active, fast-growing business whose needs will change rapidly. Able to power multiple racks of network equipment, APC’s scalable Symmetra Power Array can protect a “zone.” The modular design allows the user to configure a single chassis from 4kVA up to a fully loaded 16kVA. The system power grows with the business, using capital more efficiently.

Distributed
For smaller and growing customers with tight capital constraints that prohibit investing in unused power infrastructure, a distributed solution uses smaller individual products (i.e., APC Smart-UPS) to protect a single rack of equipment. As the number of racks grows, the number of UPSs grows in direct proportion to the business, step by step.
Innovative Products for Storage Providers

APC UPS Solutions

**Smart-UPS Rack-Mount**
This UPS solution protects your single server and connected storage device during brief or extended outages and safely shuts down connected equipment before depleting battery power. Smart-UPS will fit in a standard 19-inch rack and is capable of extended runtime. Features such as SmartBoost™ and SmartTrim™ technology add extended protection in high or low voltage situations. Used in conjunction with APC’s power management software, Smart-UPS significantly enhances network performance and reliability.

**Symmetra Power Array**
Symmetra is scalable, redundant power protection for centralized servers, datacenters and high availability applications. Users benefit from reduced service costs associated with Symmetra’s self-diagnosing, scalable components and integrated Web/SNMP management. The Power Array comes in 8, 12 or 16-kVA models. The new Symmetra Rack-Mount comes in 2, 4, or 6 kVA increments in just 8U of rack space. If your storage-connected server is one of many to protect in your datacenter, Symmetra is the right solution.

**APC Silcon® Series 3-Phase UPS**
APC Silcon Series of 3-Phase on-line power has the load capacity to serve a broad range of electrical equipment—from mainframe computers to enterprise-wide installations, production lines, electronic control systems and telecommunication equipment—with N+1 capability. Due to unique Delta Conversion Online™ technology, the Silcon Series offers the highest efficiency on the market - and thus the lowest operating costs. The Silcon Series UPS has a power factor corrected input side, ensuring that the input power factor is always 1 regardless of load and mains voltage. A power factor of 1 minimizes installation costs by allowing for the use of smaller cables and smaller fuses.

Visit [www.apc.com](http://www.apc.com) and click on “Products” for information about additional APC Storage Solutions.
APC MasterSwitch™ Vertical Mount

APC MasterSwitch™ Vertical Mount takes up zero 'U' space in standard 19" rack enclosures while providing eight 'switchable' 5-15 receptacles and eight 'always on' 5-15 receptacles for a total of 16 on-board outlets. When storage and server equipment are taking up most of your rack space, you'll appreciate the vertical mounting of APC's remote reboot device, MasterSwitch.

Is it important to you to be able to bring storage devices up in a certain order? Now you can, even remotely. APC's MasterSwitch family of remote reboot device provides advanced, remote power control to mission-critical storage and networking equipment. Eight channels of power can be managed remotely via HTTP, SNMP or telnet control. New second generation features and benefits include the ability to be flash upgraded, MD-5 security, and a new Web Interface that provides the ability to define multiple users and provide access to specific outlets (great for ISP/Colo sites.)

Network AIR 1000 ™

The Network AIR 1000 is the perfect solution to cool your server closet, datacenter, or anywhere heat sensitive equipment is kept. The portable, compact 75000 BTU portable air conditioner is easy to use and is great for spot cooling, emergency cooling, and after hours cooling. Cooling is critical as IT managers populate their server closets and data centers more densely with heat generating equipment. The Network AIR 1000 provides cooling solutions to maximize availability and reduce fixed air conditioning costs by bringing cool air precisely where it is needed. The Network AIR 1000 is versatile and can be used to cool in many environments including: server closets, datacenters, meeting rooms and home offices. In fact, you can use the Network AIR 1000 almost anywhere.
Innovative Products for Storage Providers

APC Management Solutions: Power Management Software and Peripherals

APC PowerChute® plus
This power management software provides complete administration and monitoring of APC UPSs in local area networks. Users can configure their UPS and server to initially shut down the storage device before powering down in the event of an extended outage.

PowerChute Application Shutdown Utilities
This utility enables PowerChute plus to provide safe shutdown of mission-critical server applications (Microsoft BackOffice, Lotus Notes/Domino, Oracle on Microsoft Windows NT, Apache Web Server, SAP R/3).

PowerChute Web Device Manager
This Web-based software for network administrators simplifies the management of UPSs and MasterSwitches throughout the entire network. You can access PowerChute Web Device Manager from anywhere on the network, via a web browser, to manage APC UPSs that protect servers, workstations, internetworking equipment, and MasterSwitch devices.

Management Platform Integration Software
With this APC software, users are able to monitor network components, diagnose problems, and perform proactive maintenance within industry-leading management platforms. (APC solutions include: PowerNet Manager for CA Unicenter TNG, PowerNet for Tivoli Enterprise, PowerNet Manager for Novell ManageWise, PowerNet Manager for Dell Network Node Manager [NNM], PowerNet Manager for HP OpenView Workgroup Node Manager [WNM], PowerNet for CiscoWorks 2000, PowerChute for IBM Netfinity Manager, PowerChute Integration with Compaq Insight Manager and PowerChute Integration with HP TopTools.)

PowerChute Inventory Manager
This software provides a Web-based inventory management and reporting tool for network administrators. It enables proactive battery maintenance, minimizing a major risk of downtime, and provides on-demand access to detailed UPS reports from a central location via a Web browser.

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APC Web/SNMP Management Card
This add-on card for APC UPSs is the only Web-based UPS Management product to provide full management of UPSs via multiple open standards like Telnet, HTTP, and SNMP. It is certified for and tightly integrated with Enterprise Management products. Through APC’s Web/SNMP Management Card, you can remotely monitor and configure your APC UPSs to shut down and reboot servers and connected storage equipment.

APC Environmental Monitoring Card
This card helps network administrators keep track of the temperature and humidity conditions in rack, computer room, and datacenter environments. It allows for user-definable external inputs for use with sensors for fire, water, smoke, unauthorized entry, physical security, or any external condition that can be measured via contact closure. When used in conjunction with PowerChute plus’ FlexEvents feature, the card can trigger a number of user-defined events, including paging, safe system shutdown and event logging.

APC Fiber Cables
Those utilizing Fiber Channel (FC) and Fibre Channel Protocol for SCSI (FCP) in their Storage Area Network can also count on APC for fiber cables. With the recent acquisition of ABL Electronics, APC is your one-stop shop for storage protection and connectivity.

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Before you install...

You’ve selected the storage architecture and environment. Now there are some additional benefits that APC can bring to your company. You want to conduct an audit of your company’s planned or existing electrical infrastructure before installing any expensive equipment. You want consultation on the overall power availability for your company. You want the option to outsource power management, in order to provide your system and facility managers with enough time to manage other critical resources.

Some services offered by APC include:

APC Availability Consulting
APC Availability Consultants work with clients to determine exactly how the availability of business processes can be enhanced through the measurement, monitoring and management of power. The depth of knowledge of the APC Availability Consultants allows clients to concentrate on the core business concerns without having to worry about power issues.

The consulting process involves five steps: an Availability Profiler, an On-Site Inspection, the Solution Design, the Availability Solution Installation and Availability Monitoring and Management.

APC Remote Monitoring Service
APC offers an outsourced remote monitoring solution to deliver valuable UPS and site information to network and facility managers. APC uniquely profiles each customer via a customized Web application, allowing APC monitoring technicians to react to UPS events in the same manner that your own company’s systems personnel would. This gives your system managers the ability to focus their scarce resources at other critical areas of your business. APC’s monitoring center operates 24 hours a day and will keep you informed of power events as they occur and take the necessary steps to resolve them.

A trained staff from APC’s Global Services performs the installation of the monitoring equipment. Upon installation, APC monitors all UPS parameters tailored to your desired response. Regular UPS parameter and event reports are issued with event frequency, duration, and resolution, offering immediate enhancements to your investment. With APC Remote Monitoring, you’ll receive immediate notification, immediate response, alarm reports, environmental surveillance, additional sensors, and customized escalation.

APC PowerAudit®
APC’s PowerAudit® service is a power quality analysis focused on examining the electrical infrastructure of your building. This service, performed by APC Certified Power Quality Engineers, is designed to increase the overall availability of your computing system.

APC’s PowerAudit analyzes your electrical infrastructure and determines its impact on your core business. It can be used to evaluate a facility in a proactive manner, or to identify and correct existing anomalies. Whether installing a new network or migrating from one topology or operating system to another, examining the basic wiring and grounding on-site should be the first step.

When conducting a PowerAudit, APC Power Quality Engineers survey the electrical distribution infrastructure and analyze wiring, grounding and the conformity to both the National Electric Code (NEC) and the Institute of Electrical and Electronics Engineers (IEEE) specifications. The Power Quality Engineers then make a predictive analysis of equipment performance and company susceptibility to power-related anomalies. All findings are documented in a full-length power infrastructure report.

Visit www.apcc.com and click on “Services” for additional information about APC Global Service Solutions.