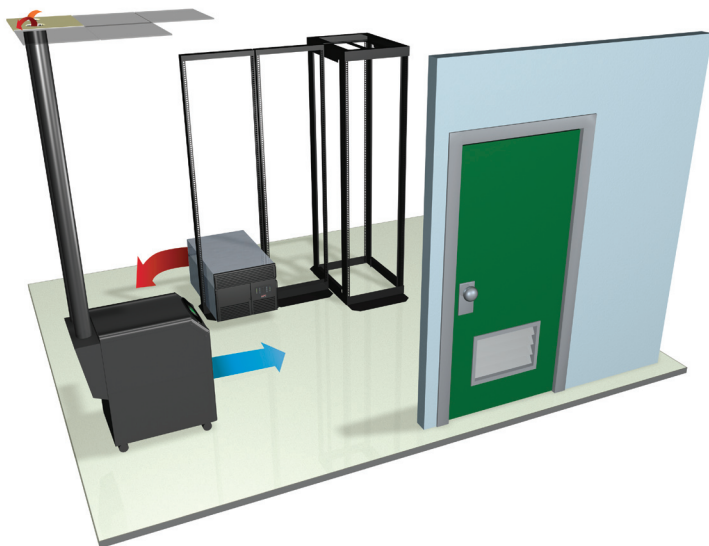


# Ensure Availability of Your Voice Over IP Installation with APC

Stay up and running, end-to-end, from desktop to IDF to MDF to data center



## Overview

The potential cost savings, shared IT maintenance, and extended features make Voice over IP (VoIP) an attractive technology for many businesses. This breakthrough of digitizing voice in packets and transporting them via Internet Protocol over existing data networks is intriguing, especially in comparison to POTS (plain old telephone service). However, what has kept POTS widely adopted is an almost non-existent concern about its availability. Chances are, if you were to pick up a traditional telephone handset right now, you're going to get a dial tone, and your telephone company is more than happy for you to take that for granted. VoIP, as a new technology, has yet to garner that level of trust. Depending on the installation, an unprotected system faced with even a one second power outage can take anywhere from 2 to 15 minutes to reboot (including re-establishing contact with all the phones connected to the system).

However, the technology continues to evolve and become equally as reliable, especially when VoIP equipment is used in tandem with APC Legendary Reliability® solutions. APC provides complete end-to-end solutions for VoIP physical infrastructure incorporating power, power distribution, racks, cooling, management, and services. These integrated solutions enable VoIP applications to obtain constant dial-tone by providing a highly available foundation for the network through scalable, standardized, and redundant architecture.



## VoIP Environments

When installed, VoIP can impact a variety of IT environments, from the Desktop to the Intermediate Distribution Frame (IDF, a network "edge" location such as a wiring closet), to the Main Distribution Frame (MDF, a network "core" location such as a network room or backbone closet) to the traditional Data Center itself.

### Desktop Environment

The desktop layer of Voice over IP is typically located in environments as varied as an employee's desk in an office or cubicle setting to a workbench/shelf. The electronic devices involved include the phones themselves and perhaps laptop computers, wireless hubs and other related equipment. Some of these items draw power from a normal AC outlet at the user's desk. Newer devices draw Power (48VDC) over Ethernet (PoE) from the IDF switch or Midspan power device fed by the switch. Typical power draw is 6 or 7 watts. A new standard, IEEE802.3af, allows up to 15W. **Challenge...** availability is affected by power problems if the phone is powered locally.

### IDF Environment

The IDF layer of Voice over IP is typically close to the technology user, in a small room/closet or shared space, like a store room, within a locked rack enclosure or 2-post racks. Such spots will most likely have 120V power, but 208V would require an electrician to rework. These areas are usually "comfort" cooled, at best, but for the majority of the times they don't even have a basic air circulation. The electronic devices involved include switches, routers, and patch panels. Typical power draws range from 500W in a small office setting to up to 4,000W in large offices. **Challenge...** heat dissipation, physical space, high availability, and electrical wiring all need to be quickly upgraded.

### MDF Environment

The MDF layer of Voice over IP may be located in a typical computer room or sometimes in a small, shared space. This environment usually contains a cement floor with tiled ceiling and is cooled with the building's cooling system (or sometimes precision cooling). Both open racks and enclosures can be mixed throughout this location. The electronic devices involved include switches, routers, and application servers. Power needs range from 4 to 40kW in either Single-or Three-phase requirements. **Challenge...** the physical infrastructure (rack, power, and cooling) is most often in need of a quick upgrade.

### Data Center Environment

The data center layer of VoIP is usually located in an environmentally controlled room, more than likely in enterprise/mid to large-sized companies. All power options are readily available. Four post rack enclosures hold servers while open racks contain the switches and other networking equipment. The electronic devices involved include call servers, application servers, and backbone switches. Power needs range from 10kW to several MW. Single and three-phase power are available as options, but three-phase is typically used. **Challenge...** racks must be quickly integrated into the data center infrastructure for the new switches and servers to provide higher levels of availability.

# VoIP Solutions

## VoIP SOLUTIONS

### Integrated NCPI System Architecture

InfraStruXure® Systems for VoIP Applications  
 InfraStruXure for Wiring Closets  
 InfraStruXure for Data Centers

### Cooling

InfraStruXure InRow Cooling SC or RC  
 InfraStruXure Rack Air Containment System  
 InfraStruXure Cooling Distribution Unit  
 Wiring Closet Ventilation Unit  
 Air Distribution Unit  
 Air Removal Unit SX  
 Side Air Distribution Units  
 NetworkAIR® PA

### Racks/PDUs

NetShelter® Racks – 2-Post, 4-Post,  
 Enclosures, Basic, Metered or  
 Switched Rack PDUs

### Power

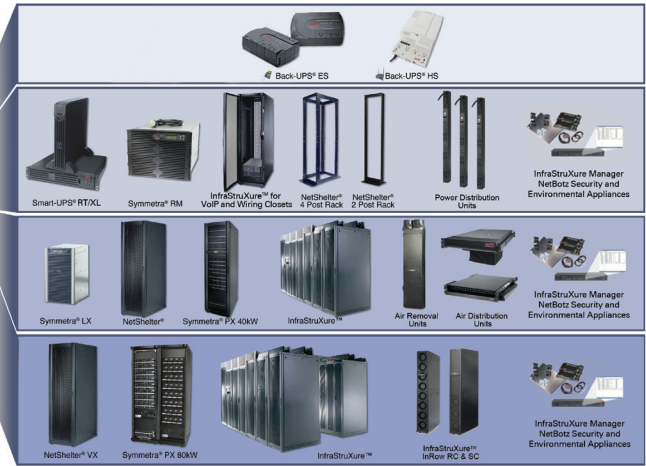
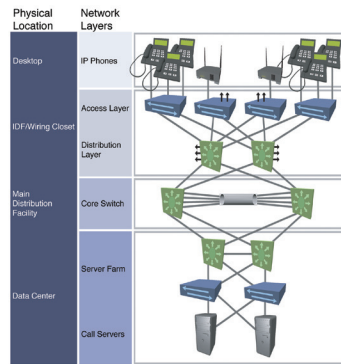
Symmetra® RM, LX, or PX  
 Smart-UPS® XL or Smart UPS RT  
 BackUPS® ES or HS

### Management and Security/Environmental

InfraStruXure Manager  
 NetBotz® Security and Environmental Appliances  
 UPS Network Management Card  
 Environmental Monitoring Unit/Card

### Services

Needs Assessment and Power Audit Services  
 Remote UPS Monitoring  
 Onsite Service with Preventative Maintenance



# Key Considerations

## Power

- Size the total UPS load, not just the switch. Also, be aware of how the phones are powered and provide protection, if needed.
- Determine needed availability requirements (N+1 redundant or 2N redundant).
- Provide ample runtime across the entire network. One to two hours is a typical requirement for phone systems.

## Racks/Power Distribution Units

- Select open racks for switches with side-to-side air flow.
- Choose racks that will support larger UPS and battery frames.
- Ensure availability of enough receptacles and check that PDU strips won't be overloaded.

## Cooling

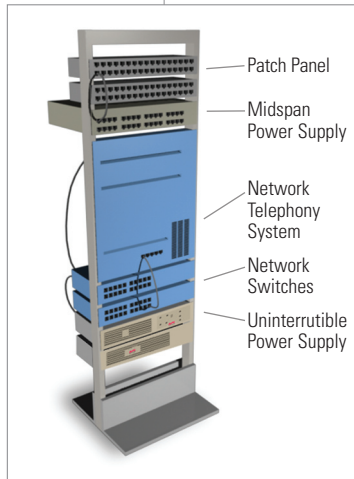
- Ensure that your selected solution allows for monitoring of temperature in the room.
- Identify increased ventilation/cooling needs and supplement as needed.

## Services

- Consider on-site service for locations with little to no support staff in addition to needs assessment surveys and expert installation.

## Management

- Design a complete management strategy for the entire infrastructure rather than individual equipment.
- Ensure a sound strategy for networks with many remote sites.



# VoIP Resources

## VoIP Applications Web Page

"Solutions for... VoIP" Web page provides resources and solutions for VoIP deployment, including: white papers, application notes, end user & training presentations, third-party articles and product/design information. Go to [www.apc.com/VoIP](http://www.apc.com/VoIP).

## Literature

### VoIP Sell Sheet

### White Papers and Application Notes

- 1. APC White Paper #69**  
 "Power and Cooling for VoIP and IP Telephony Applications"
- 2. APC White Paper #79**  
 "Technical Comparison of On-line vs. Line-interactive UPS designs"
- 3. APC Application Note #50**  
 "APC Power Protection for Cisco VoIP and IP Telephony Solutions"
- 4. APC Application Note #51**  
 "APC Power Protection for Nortel VoIP and IP Telephony Solutions"

## Related Programs

Data Center University - [www.datacenteruniversity.com](http://www.datacenteruniversity.com)

APC's quality system is certified by ISO 9001 standards



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