

Title: Genesta Overhead Paging White Paper
Sub Title: A More Flexible Approach to Paging in the Warehouse

1. Abstract:

Traditional zoned paging systems are proprietary, inflexible and difficult to manage. Replacing them with IP based paging speakers provides for flexible zoning, per speaker management capabilities and leverages investment in existing warehouse LAN/WLAN infrastructure.

2. Body:

2.1. Paging Primer:

Paging is an important if not under appreciated service in your warehouse. A properly installed system ensures access to the workers in your building enabling you to:

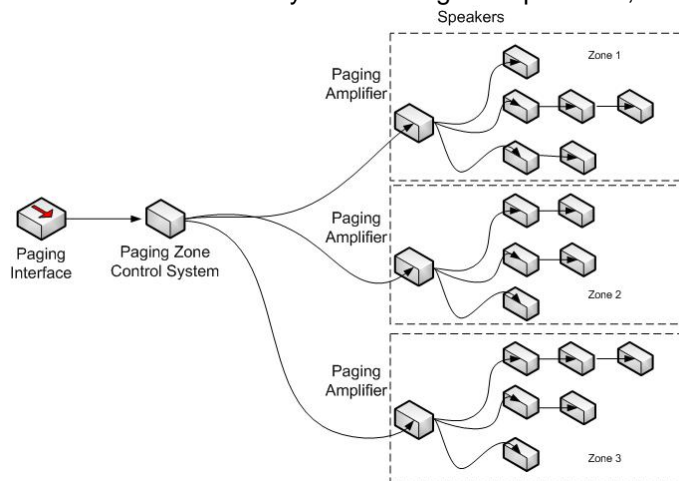
- Quickly communicate with your mobile work force
- More efficiently handle phone calls
- And Provide important safety notifications in real time

Basic systems simply broadcast messages to all installed speakers. Advanced systems allow you to direct that capability via zoning. The ability to logically group speakers and address a message solely to a “zone” ensures that messages are only delivered to the intended audience.

2.2. Traditional Paging

Traditional paging systems accomplish this task by physically wiring all of the speakers in a zone to an amplifier which is then connected to a zone controller which is connected to a paging interface on the warehouse’s phone system (PBX). Although the zone controller itself may have intelligent capabilities, the amplifiers and speakers do not. Like your cars stereo system, the amplifiers simply take sound input and transmit it to the speakers with adequate power to ensure that the sound is heard through the attached speakers.

The diagram to the right illustrates a traditional zoned paging system. The advantage of this solution is its simplicity.



However, the system has several disadvantages:

- Because the speakers are chained together, the failure of a single cable can bring down an entire zone.
- Each zone is created by wiring individual speakers together. Therefore, adding, deleting or moving speakers within zones requires physical wiring changes.
- Because zones are physically wired together a speaker can only operate within a single zone.
- Because the speakers are passive devices, they cannot be remotely diagnosed or managed. Determining if a speaker is properly connected and operational in many cases requires that a facilities person visit the speaker location and inspect it.

Although these systems are simple to deploy, they are often not well understood by the support staff within the warehouse. Their operation falls outside of the expertise of your network support staff and

telephony support staff deals with their operation infrequently. The result is that when problems occur, the warehouse must rely on an outside vendor to maintain and support the solution.

2.3. IP Paging

In contrast, IP paging provides an equally simple network based solution which addresses the limitations discussed above. The IP in IP Paging refers to the Internet Protocol and notes that an IP paging solution relies upon the same communications infrastructure used to connect computers and printers in the warehouse to the warehouse's phone system.

Unlike a traditional zoned paging system, in an IP based paging system, each speaker is connected directly to the network. The speaker is identified by its own unique address, has its own power source (amplifier) and may be communicated with and managed individually. A simple zoned IP paging system is depicted below.

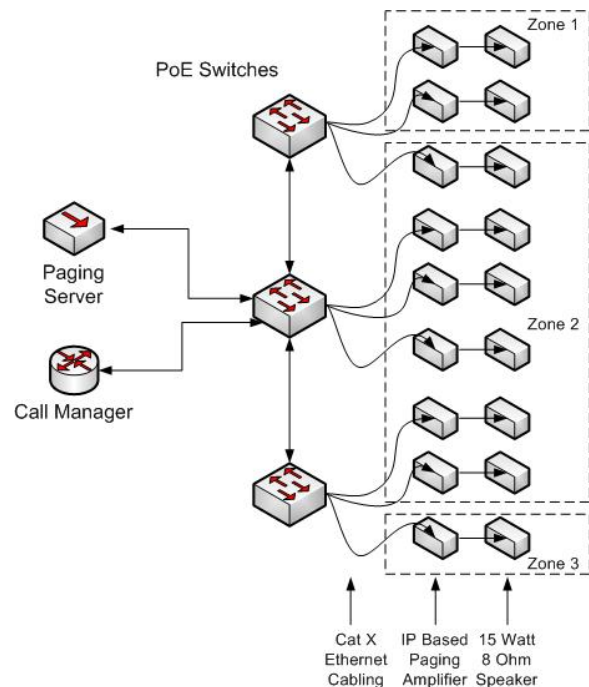
In office environments, the power source and speaker are included in a single device which is designed to be mounted in a ceiling tile. In a warehouse however, the solution often involves two pieces; a network attached amplifier and a traditional passive paging speaker. The advantage of this solution in a warehouse is that the type of speaker can be matched to the environment.

Both approaches are powered by Power over Ethernet (PoE). This approach allows the speakers to be deployed without the installation of a power source at the speaker location. A single Cat 5/6 cable may be run to the speaker location from an existing data closet and attached to a PoE capable switch. Since PoE switches are commonly deployed for wireless access points as well, the speakers may be connected to an existing piece of equipment, lowering the overall cost of the solution.

Once installed, zoning is accomplished by a paging server. The paging server is an inexpensive appliance which logically groups speakers together, allowing a group of speakers to be addressed simultaneously. Because the grouping is accomplished through software rather than through cabling, zones can be easily reconfigured and if appropriate a single speaker can be included in multiple zones. Other features unique to IP paging include:

- Support for up to 99 zones using a single paging server.
- The ability to page all zones and a pre-emptive messaging mechanism to allow certain high priority pages to override lower priority pages.
- The ability to individually adjust the volume of each paging speaker.
- The failure of a single paging speaker does not affect the operation of the overall paging system
- The ability to add new paging features by upgrading speaker or paging server software.
- The ability to configured speakers via a web browser interface and update speaker software remotely when new features become available.

These devices are network devices like any other device on the network and therefore, easier to support. Each speaker can be remotely managed using the same people, skills, and tools used to manage computers, network equipment, and printers in the warehouse. The solution builds on existing infrastructure rather than relying on new or different infrastructure.



Of course, when compared to traditional paging, a comparable IP based system is often more expensive. Depending upon what network infrastructure is already deployed in the warehouse, an IP based solution may cost between 10% and 30% more to install than a traditional paging solution. However, that installation cost advantage is offset in the long run by costs savings derived from IP paging's added flexibility and integration with the warehouse's standard data network.