Leverage the IP Network for Communications and Safety in K-12 Schools

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A little about me…

- Director of Engineering Services for Audio Enhancement, Inc
- Chair of the BICSI Emerging Professional's Group
- Previously a School District Technology Coordinator

A little about you?

- Installers/Integrators
- Engineers/Consultants
- End Users

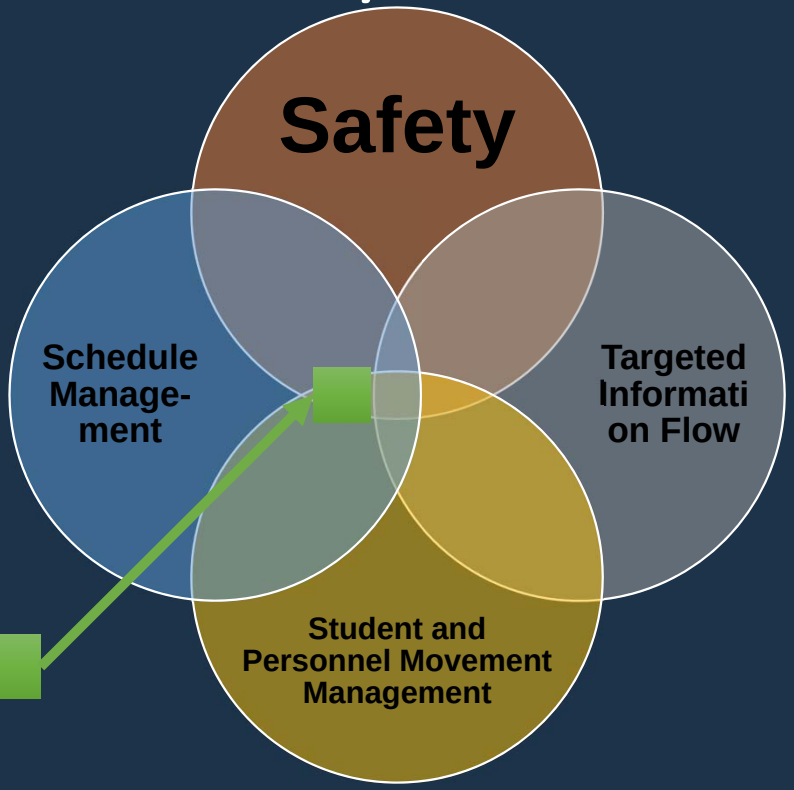
Alphabet Soup

- IPB - Intercom paging and Bells
- VoIP – Voice over IP
- SIP – Session Initiation Protocol
- RTSP – Real Time Streaming Protocol
- UDP – User Datagram Protocol
- TCP – Transmission Control Protocol
- VLAN – Virtual Local Area Network
- QoS – Quality of Service
- ACL – Access Control List
- NTP - Network Time Protocol

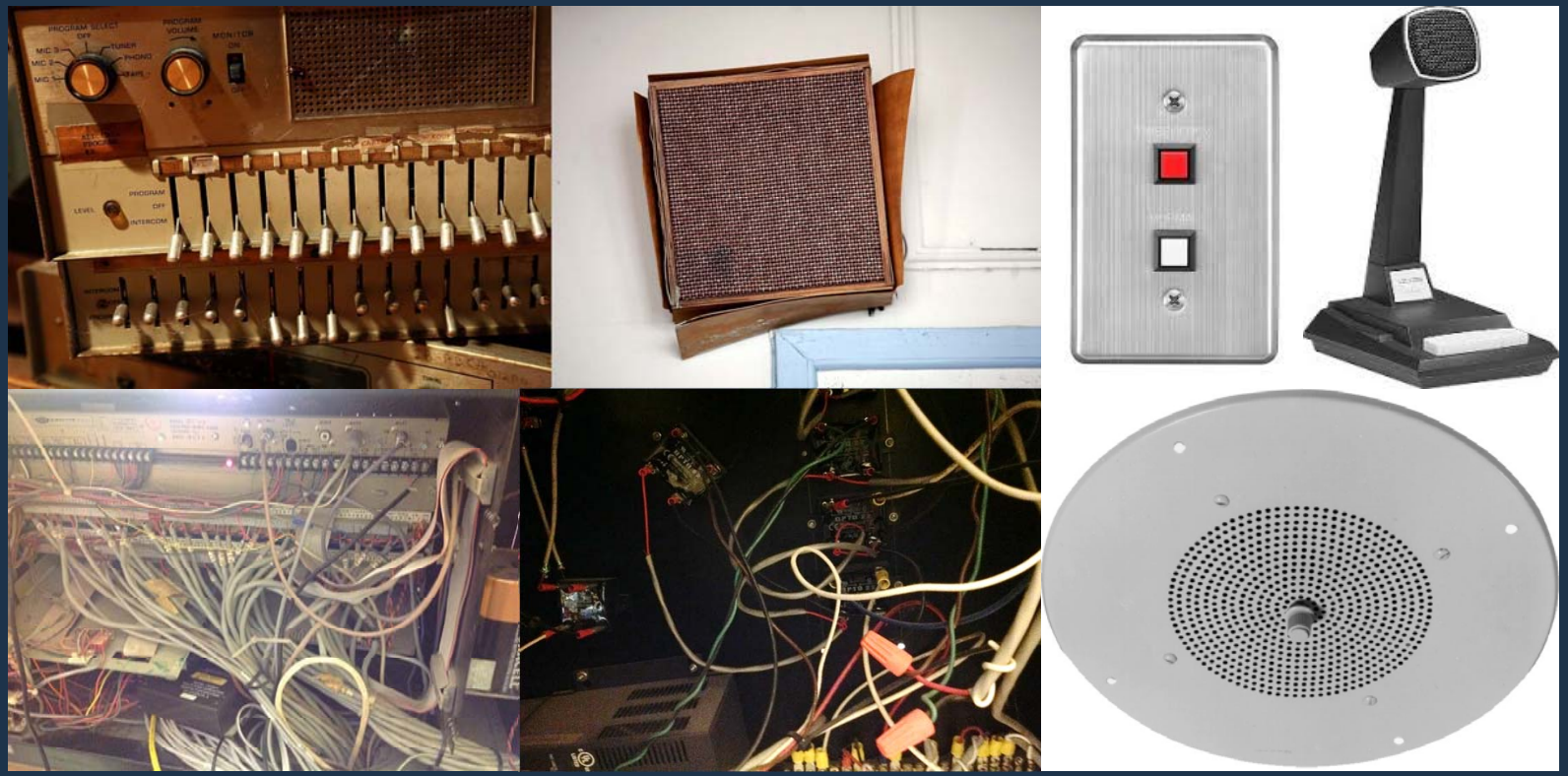
What are we going to be talking about today?

- Why is there the need for IPB Systems.
- What traditional systems have looked like in the past
- What systems in the future look like
- Leveraging the network and more importantly standards based cabling.
- What are the risks.
- How we overcome the risks.
- Open Discussion.

Why do we need IPB Systems in K-12?



A look at the past of traditional systems



There's no school like the old school

Pros

- Separated system.
- Controlled and closed environment.
- Centralized.
- Many systems last for 30+ years.
- Fairly robust and simple technology.

Cons

- Can be highly proprietary.
- Consolidated disparate systems.
- Lots of dedicated cabling.
- Separate infrastructure.
- Little to no integration.
- Centralized distribution.
- Costly Changes.

Look at the IP based systems offered today.

Move over Gramps!

Pros

- Converged
- Integrated
- Shared
- Decentralized
- Intelligent
- Monitored/Redundant
- Adaptable and Configurable

Cons

- Can be costly
- Concerns on reliability
- Reliant on the network
- Dreaded IT Guy – required coordination
- Stigma of being new and untested
- More complicated

Why would we want to do this?

From a design engineering stand point…

- The IPB cabling design becomes part of the standard horizontal twisted pair cabling.
- We can guarantee the performance of the cabling infrastructure.

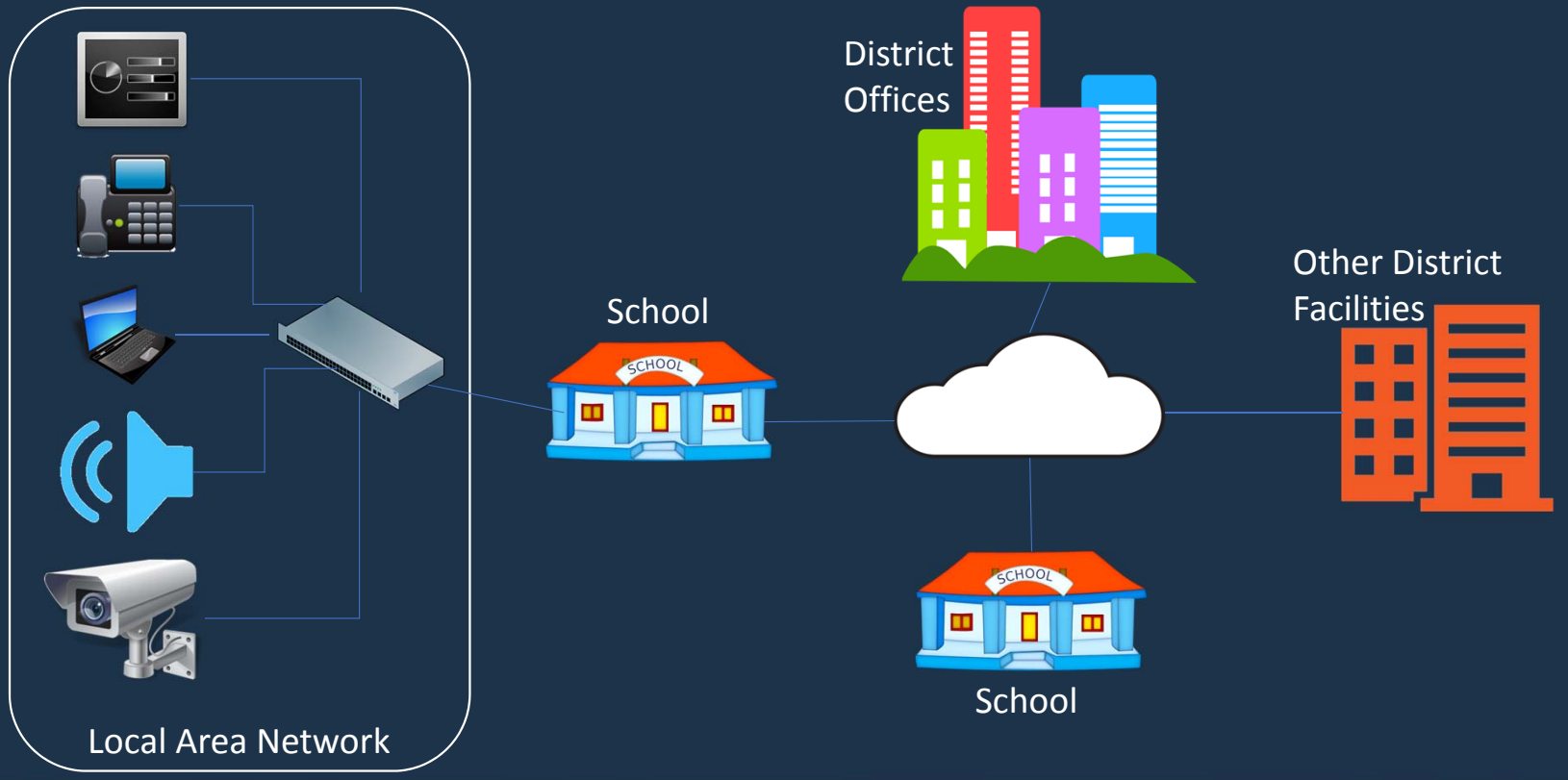
From an end user stand point…

- Universal cabling system that can be utilized for multiple technologies
- As devices age and technology improves upgrades are easy
- Service is simplified.

Ok, that's great, but lets talk about the network…

- Schools/Districts have spent the last 20 years building and investing in very robust enterprise data networks.
- The data network infrastructure is deemed a necessary critical building wide system and is treated as such.
- We already trust some of our most critical systems to these data networks.
- In many cases the IT/Network teams are the ones that now own the IPB systems

Systems we trust every day to IP…



So what are the risks of going IP?

- Network Security!
- Uptime/readiness concerns
- Overall system/network/hardware issues
- Complicated system for implementation and the end user.
- Poor performance
- Interoperability issues
- May not scale well

How do we overcome these risks?

- Good solid design.
  - Overcoming concerns about uptime, reliability
- Taking a standards based approach.
  - Overcoming concerns on interoperability, scalability, complexity
- Leveraging managed network technologies.
  - Overcoming concerns on network security, performance
- Leveraging the technology

Good design…

- Everyone in this room knows that the physical layer is where it all starts. Installing the cabling infrastructure to the standards is a good start.
- Proper sizing and type of network switches for PoE power to our devices.
- Appropriate sizing of UPS and generator circuits for backup power.
- Redundant server and network connections. N+1

Standards and protocol based approach…

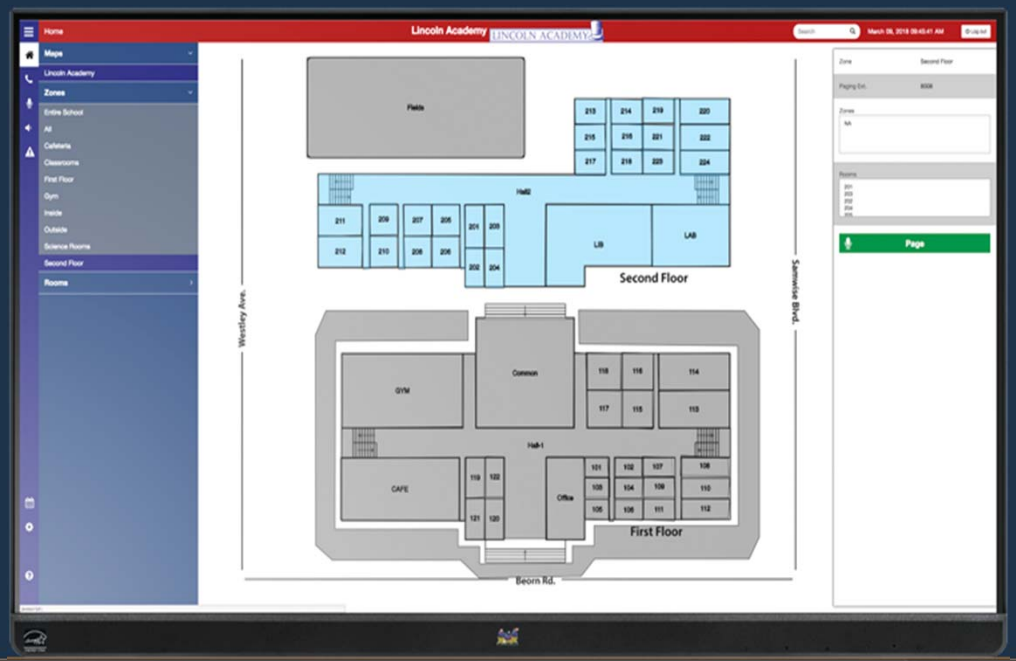
- IEEE 802.3 is the standard for wired ethernet networks.
- The following protocols are defined and used in almost all IP based IPB Systems.
  - SIP – Session Initiation Protocol RFC 3261 (Application Layer)
  - RTSP – Real Time Stream Protocol RFC 2326 (Application Layer)
  - HTTP – Hypertext Transfer Protocol RFC 2616 (Application Layer)
  - UDP – User Datagram Protocol RFC 768 (Transport Layer)
  - TCP – Transmission Control Protocol RFC 675 (Transport Layer)
- G.711 – ITU-T Standard for Audio Compression – largely used in telephony (Standard)

Managed networks and what they can provide…

- Network security is a real threat to any system but especially critical systems. Past basic user authentication, employing network technologies like ACLs can mitigate unauthorized access.
- As networks grow and larger number of devices connect the concern over network performance become a reality for many streaming based technologies like IP IPB Systems. Deploying technologies like VLANs and QoS almost immediately overcome those issues.

Technology makes things easier…most days

- Many systems now offer a much more human friendly interface that is intuitive and interactive.
- If they can use FaceBook…



Lastly overcoming the fear

- Most IP IPB Systems are built on the same technologies as VoIP systems.
  - VoIP is based on standards
  - Widely deployed
  - Natural interface for paging systems
  - SIP allows for devices to send and receive low latency audio bidirectional
  - Redundancy/Power Backup
  - Monitoring
  - Native to most network hardware

Leveraging the technology into the future…

- Connections to other systems
- Emphasis on Safety
- Integrated into AV Systems in the classroom

Discussion…

Recap of discussions…

Thank you!

- If you would like to contact me feel free to reach out.

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