Understanding NFPA 72: “Class N” Ethernet Infrastructure

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Important Items of Focus

Public Address solutions within the built environment are necessary systems to communicate with the building occupants; whether for general communication needs or crisis intervention.
Important Items of Focus

When speaking of paging

- Is it a High Reliability Solution?
- Is it a Distributed Architecture?
- Is it a scalable product solution?
- Does it have the opportunity for integration?
- Is it EN-54 certified?
- Is it capable of supporting the voice communication needs of:
  
  **NFPA 72 – 2016 Emergency Communication System**
Important Items of Focus

NFPA 72®
National Fire Alarm and Signaling Code

2016 Edition

- 377 pages
- 827 changes
- Still just a guideline

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NFPA-72 2016 Key Changes

Class N Infrastructure

“Perhaps the most significant changes to the Code pertain to wiring. The 2016 edition adds Class N, which addresses internet infrastructures for alarm and signaling systems; pathway performance and installation criteria are provided.”

This also impacts the UFC 4-021-01
NFPA-72 2016 Key Changes

Chapter 10- Fundamentals

10.5.3.4 Means of Qualification. Qualified personnel shall include, but not be limited to, one or more of the following:

(1) Personnel who are factory trained and certified for the specific type and brand of system being serviced

(2) Personnel who are certified by a nationally recognized certification organization acceptable to the authority having jurisdiction
NFPA-72 2016 Key Changes

The NFPA 72 now defines three critical terms every ECS must address:

- Audibility
- Intelligible
- Intelligibility
NFPA-72 2016 Key Changes

**Audibility** requires the alarm tone to be 15dB above any ambient noise — but only the alarm tone, not voice messaging.
Intelligible is the ability to understand the directions.

As required by the NFPA code, messaging must make sense to everyone in the space, and signage — either active or passive — must be used to clearly indicate the escape route or location of refuge.
NFPA-72 2016 Key Changes

**Intelligibility** is the acoustic measurement of a space to provide the optimal environment for hearing the system’s voice messages. The code requires an average Sound Transmission Index of .5 for the entire space. This means in large spaces with hard reflective surfaces, acoustic technologies, such as steerable arrays, must be employed to increase the speech intelligibility of the ECS.
NFPA-72 2016 Key Changes

Subjective versus Objective

- Audible- Objective as it is measurable
- Intelligible- Subjective and situation specific
- Intelligibility- Thought to be Objective but the code now allows a Subjective analysis.

The design must be Objective, the commissioning MAY be Subjective
Speech Transmission Index

Decimal scale from 0 - 1 quantifies speech intelligibility

0 = not intelligible

1 = perfectly intelligible

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STI (Speech Transmission Index) - color ranking interpretation
NFPA-72 2016 Key Changes

Message Templates

“Warning messages should provide information to the occupants on the state of the emergency and what they are supposed to do in response to this emergency. The warning message should come after an alert signal is given and can be provided via visual or audible means.”
NFPA-72 2016 Key Changes

Message Templates

“Attention [floors 9, 10, and 11]. This is your [Building Safety Officer, Joe Smith]. A fire has been reported on the 10th floor of the building. Everyone on the [9th, 10th, and 11th floors] should move to the [8th floor] to be protected from heat and smoke, since heat and smoke can creep into nearby floors during a fire. Use the stairs immediately. Do not use the elevators. Those who need help getting to the 8th floor, please wait inside the stairwell.”
NFPA-72 2016 Key Changes

Message Templates

“Attention [floors 9, 10, and 11]. This is your [Building Safety Officer, Joe Smith]. A fire has been reported on the [10th floor] of the building. Everyone on the [9th, 10th, and 11th floors] should move to the [8th floor] to be protected from heat and smoke, since heat and smoke can creep into nearby floors during a fire. Use the stairs immediately. Do not use the elevators. Those who need help getting to the [8th floor], please wait inside the stairwell.”
NFPA-72 2016 Key Changes

Ethernet Block Diagram
NFPA-72 2016 Key Changes

Class N Block Diagram

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Network devices can be categorized in two basic categories:
- Data Endpoints
- Data Forwarding Equipment

Class N paths require alternate communication pathways where more than one device would be impacted by a fault.
NFPA-72 2016 Key Changes

Mass Notification is now referred to as the Emergency Communications System (ECS)
ECS

The ECS Layers

VOICE

VISUAL

PERSONAL
ECS

Every facility utilizes the layers differently as the population within that building have different communication needs.

Five vertical markets have been defined to illustrate the different usages of the layers.
Example ECS Layer Usage

Transit
- VOICE
- VISUAL
- PERSONAL

Healthcare
- VOICE
- VISUAL
- PERSONAL

Education
- VOICE
- VISUAL
- PERSONAL

Corporate
- VOICE
- VISUAL
- PERSONAL

Public Venue
- VOICE
- VISUAL
- PERSONAL
The Integrated ECS

Remember the NFPA page templates?

- Disparate and autonomous systems are brought together to achieve a common goal
- Each system has a different level of priority depending upon the facility and the application of the ECS layers
- Automation is used to simplify the complex tasks required during the crisis
The Integrated ECS

The Process

- Risk Analysis/Risk Vulnerability Assessment
- Emergency Response Plan/Crisis Intervention Plan
- Requirements reside within CSI Divisions 25, 27, or 28
The Integrated ECS

Physical Security Information Management

- OnSSI
- CNL
- IronYUN
- Qognify
- Genetec
Questions

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