

INTRON-X THE NEW X-PERIENCE



ONE SYSTEM X-SOLUTIONS
Purpose to be included



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ONE System - X Solutions



Public Address (PA)



Alarms & Warnings
(PA/GA)



Intercom



Siren
(HPSA)



Mobile
Communication



Management
& Monitoring



Control Room
Applications



Almost **60 years** of experience in the industry made this innovation possible!





System Capacity

200 digital terminals
per node



200 analog terminals
per node



1000 warning sequences



250 nodes



100,000 terminal devices



200 priority levels



Audio channels
per node:

- Dig – IP: 200
- Dig – Dig: 200
- IP-IP: 400



400 IP terminals
per node



1000 programmable
speaker zones

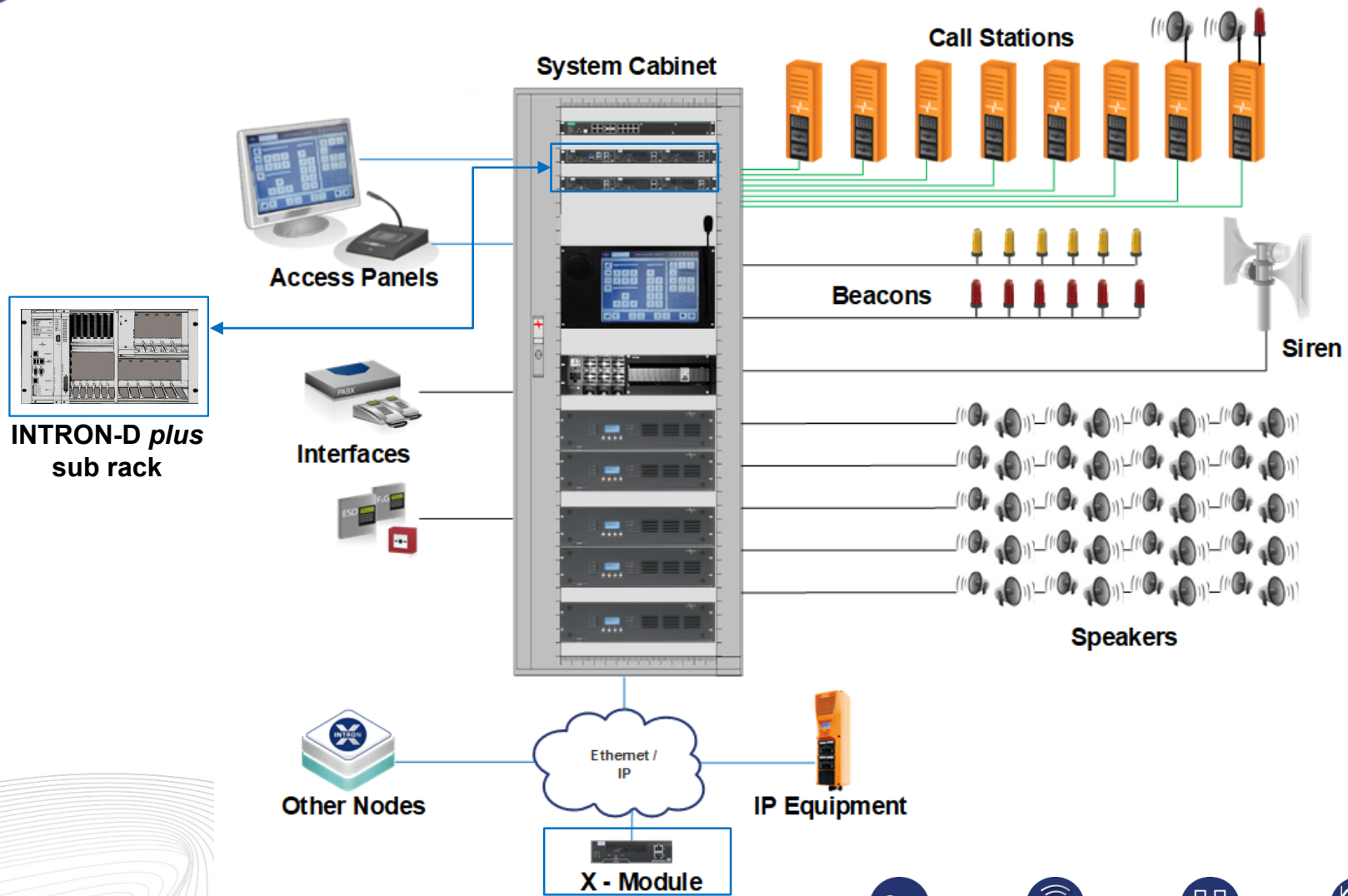


1000 group calls





Typical System Setup





Characteristics INTRON-X Modules

- 19" 1U chassis for installation into a 19" mounting frame
- Standard module size
Width: 1/3 19" Height: 1 RU (44 mm) Depth: 265 mm (10.43")
- Installation into INDUSTRONIC cabinets or existing cabinets on site
- Communication between all modules via IP
- Uniform and fanless industrial design
- Indicators according to EN 54-16
- Flexible combination options





Overview INTRON-X Modules



X-Controller (XCO) – intelligent processor unit
System controller or CPU



Digital Gateway Module (XDG)
For connection of digital stations, devices or modules



Analog Line Module (XAL)
For AF & I/O contact signal connection or interfaces



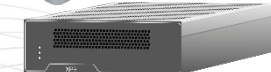
I/O Module (XIO)
For I/O contact signal connection or interface



Beacon Control Module (XBC)
For controlling/activating the beacon lines

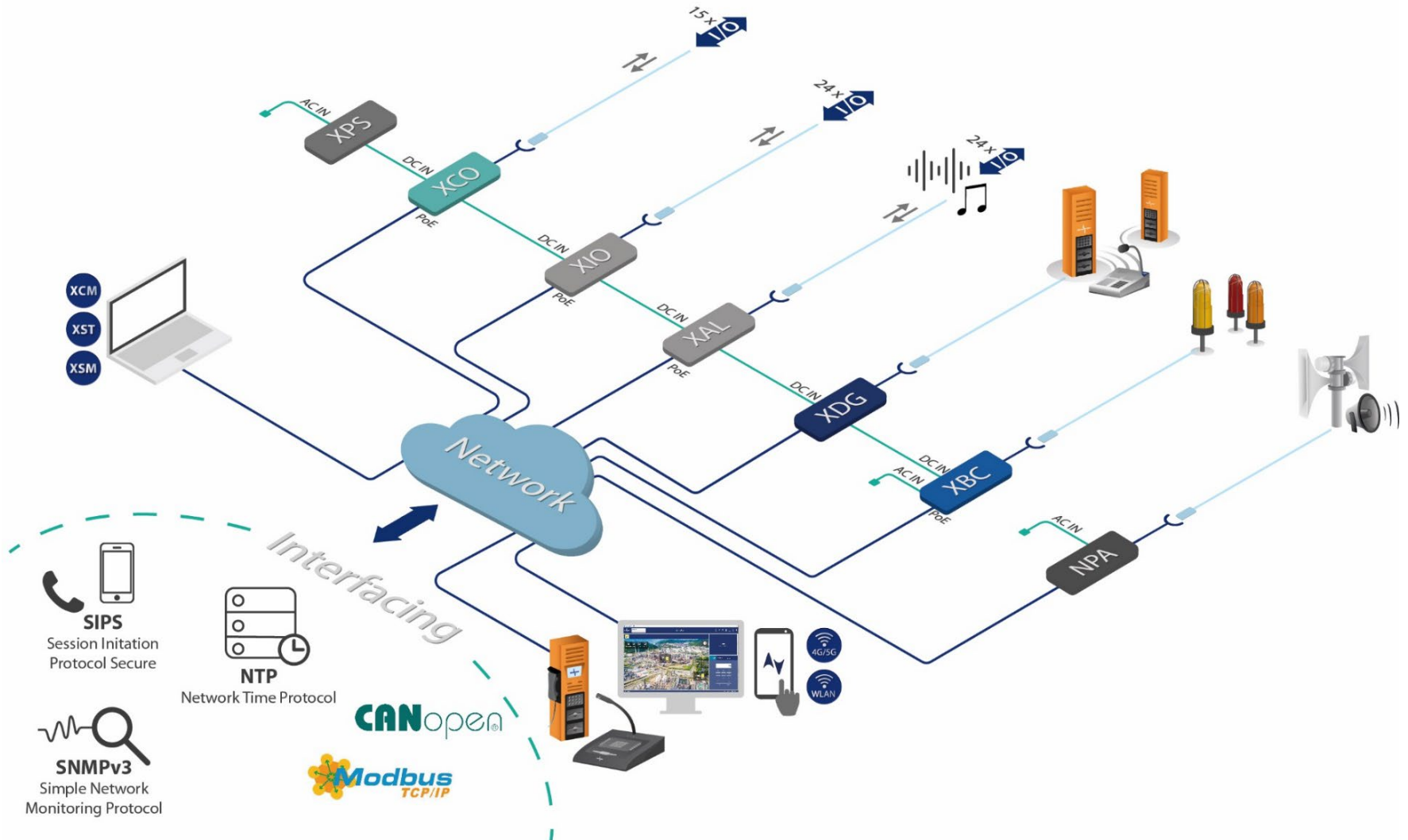


Power Supply Module (XPS)
For power supply of system components



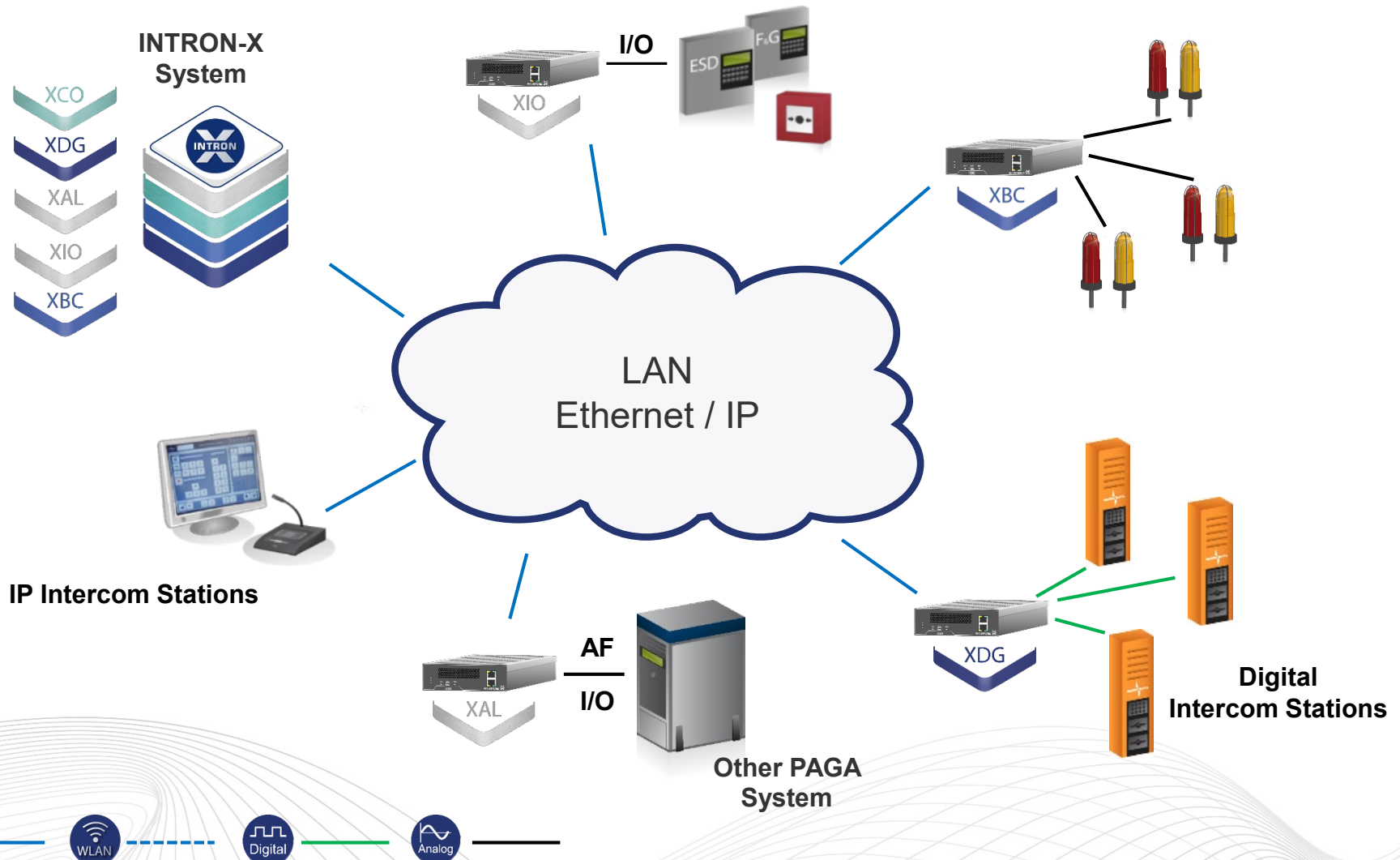


INTRON-X At A Glance



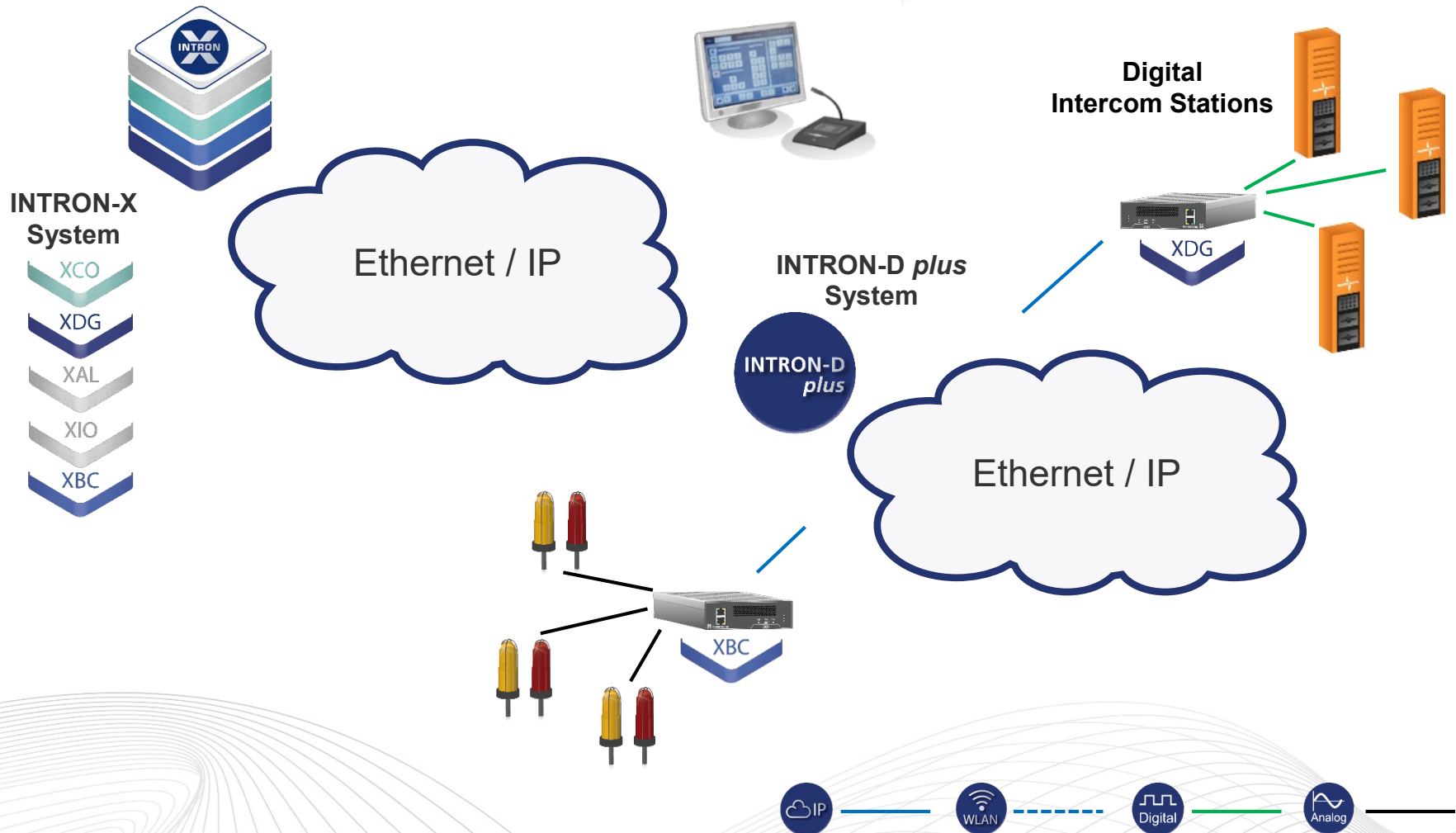


Flexible & Effective Decentralized Design





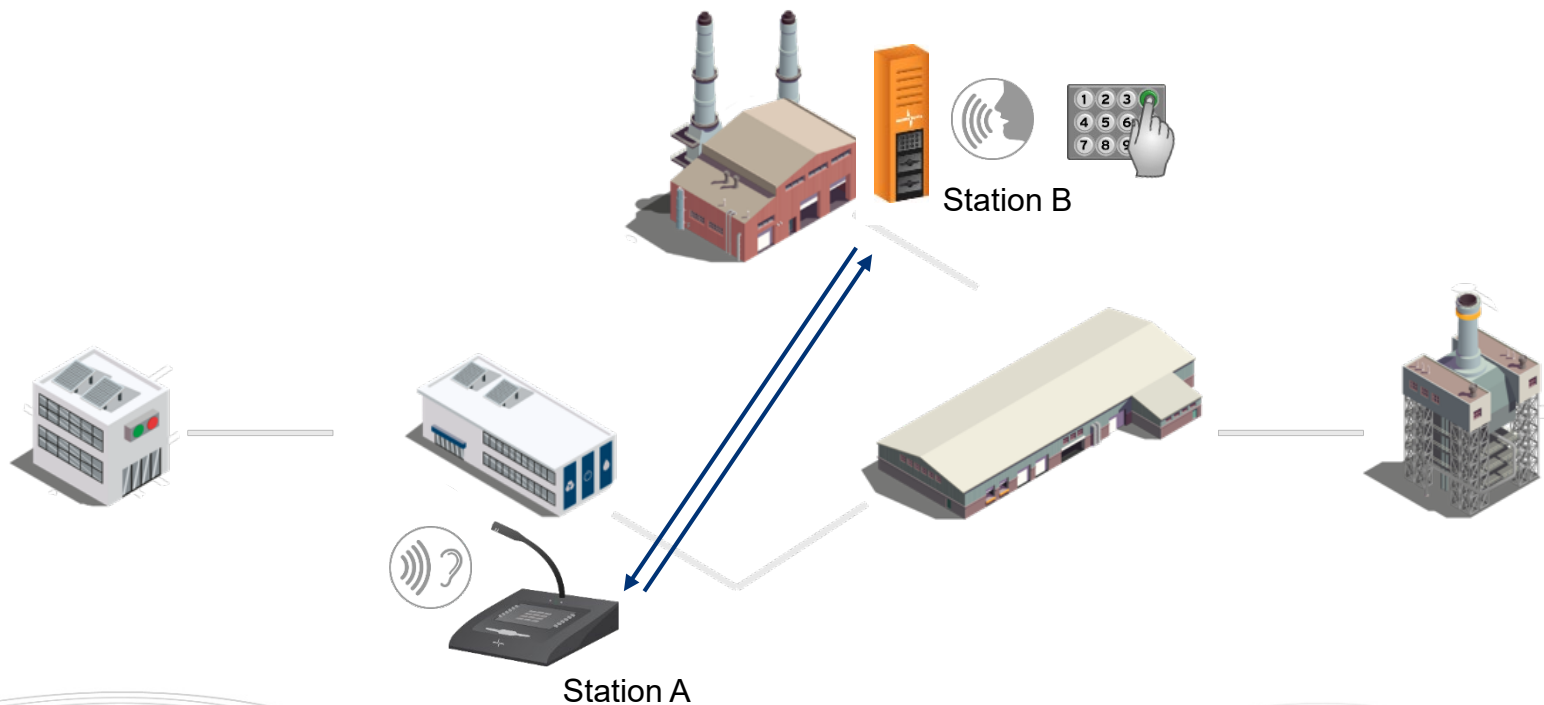
Backward & Forward Compatible





System Function - Intercom

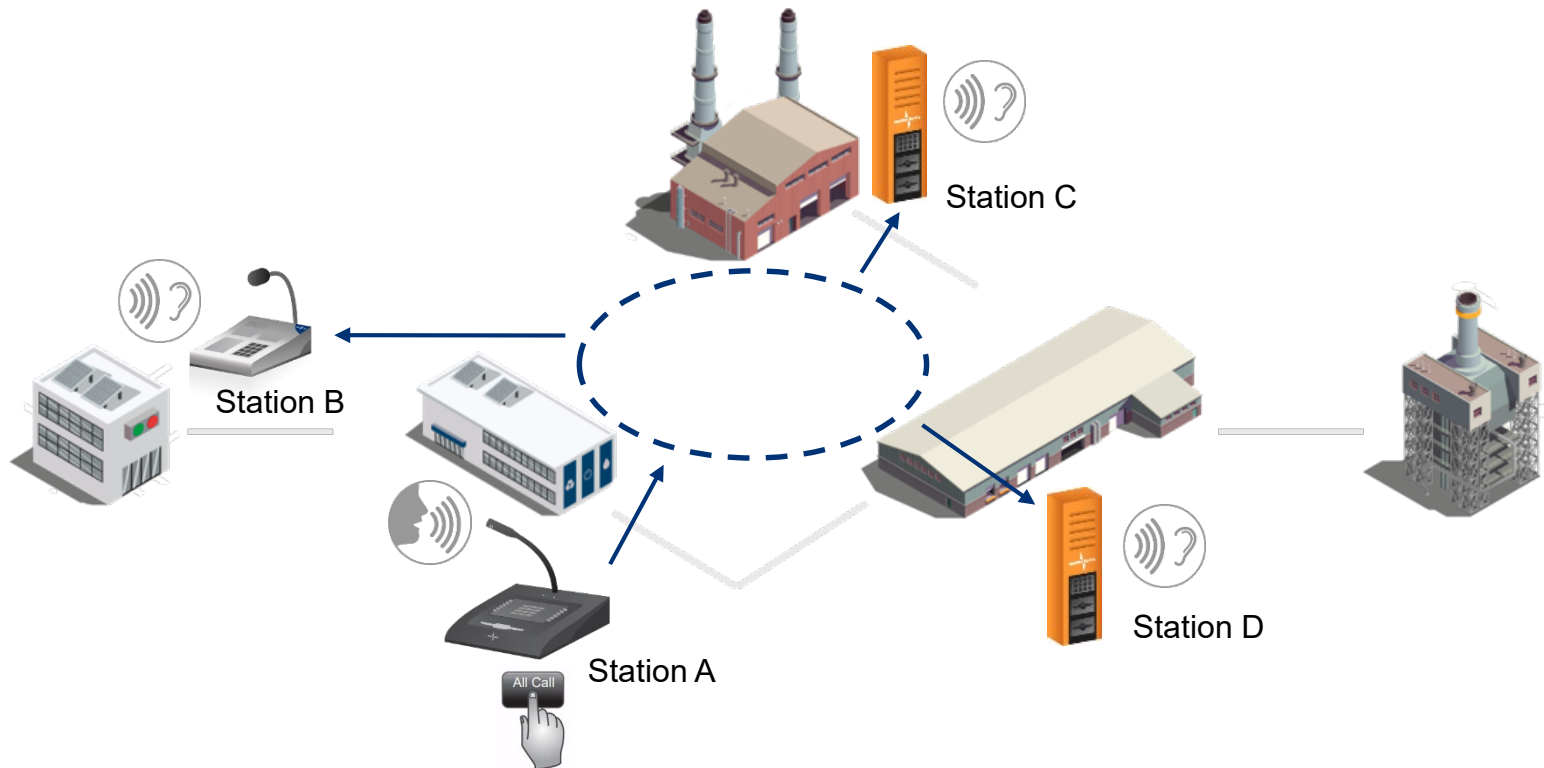
- Direct Two-way Communication (predefined) or
- Dynamic Two-way Communication





System Function - Intercom

- Conference („Party“)



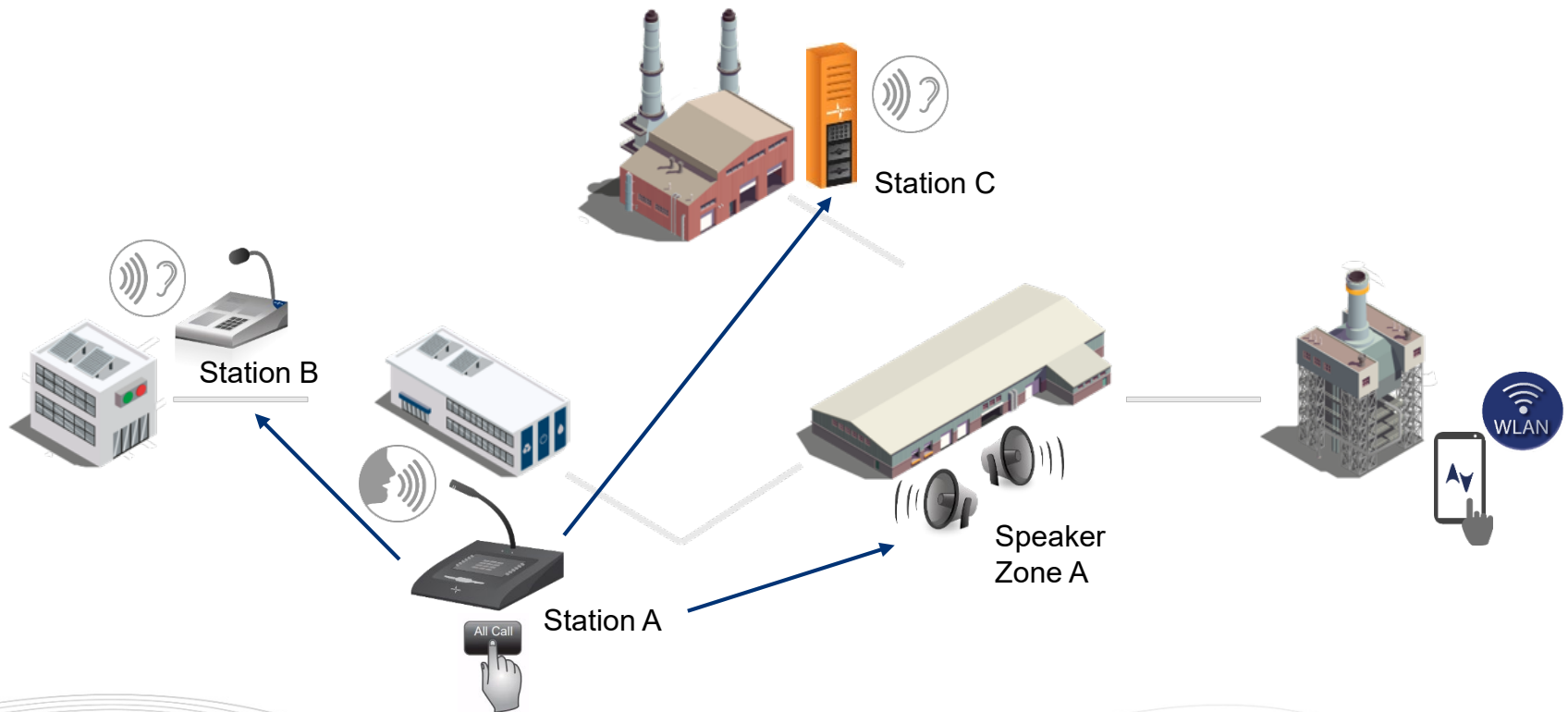
Conference channel





System Function - Intercom

- Group Call and All Call („Page“)





Intercom Stations

A wide variety of intercom stations available for selection depending on the project or plant operation requirement

- Indoor, outdoor, weather-proof & Ex-proof
- Desktop, wall mount, flush-mount & 19" rack mount
- Physical buttons or touch screen
- Digital & IP type
- Wireless (Wifi, GSM/LTE & RF)





Access Panel (AP Series)





Digital Intercom Station & Accessories



Horn speaker

Equipment identification

Microphone

Dial keypad (new technology)

Momentary rocker switch

Handset



Booster amplifier 25 W



Ex flashing warning beacon
48 V DC or 60 V DC



Foot switch



Headset



Free-standing mounting post



Acoustic hood





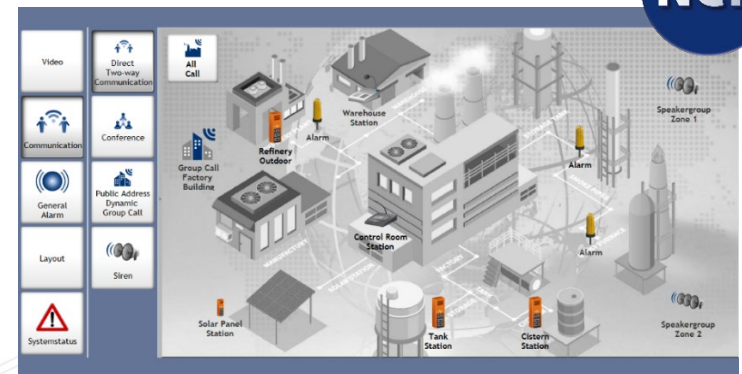
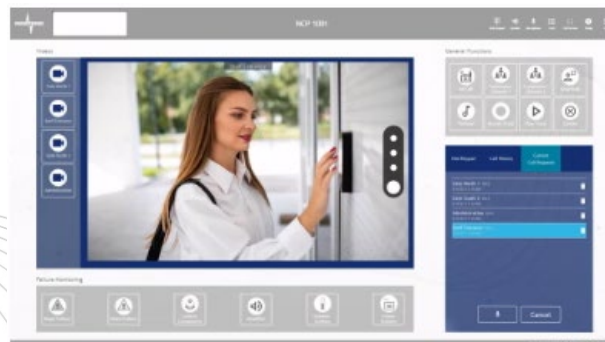
IP Outdoor Intercom Station x NRO xx2/DH





Network Control Panel (NCP) – For Management or as Engineer Test Panel (ETP)

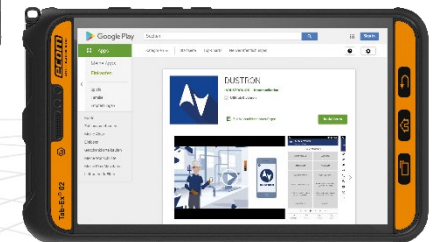
- PC-based intercom station NCP (Desktop or 19" rackmount version)
- Customized user interface
- Configuration via Config Manager software
- Visualization of the plant
- Status information of all connected devices is displayed
- Different layers, background images, icons and buttons
- Initiate voice connections, announcements or warning sequences with a click
- Access control with video integration





DUSTRON – Ready for Industrial Internet of Things (IIoT) Application

- App for Android and iOS 
- Use your smartphone/tablet as mobile intercom station 
- Mobile communication throughout the plant 
- PTT communication via display or hardware buttons 
- Group communication as an alternative to mobile radio 
- Remote triggering of alarms 
- Convenient maintenance functions 
- Connection via WLAN or GSM/LTE 

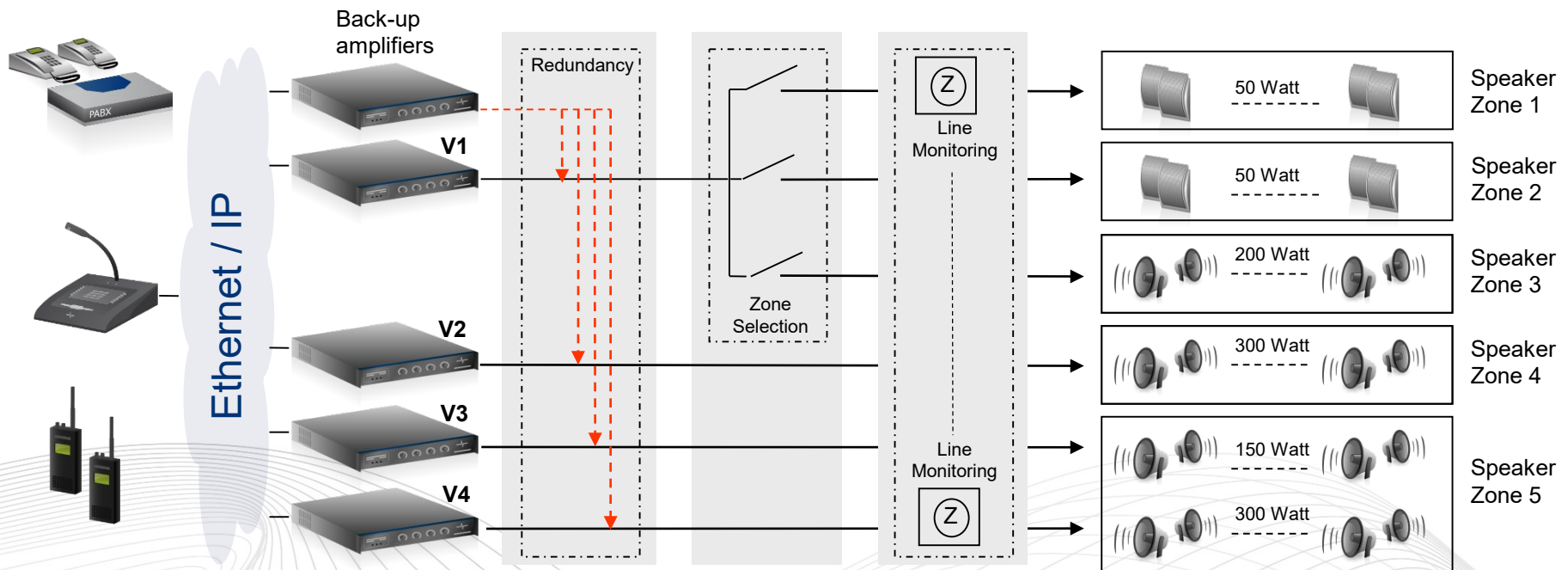




System Function – Public Address (PA)

This function enables one-way broadcasts or announcements in the plant

- The announcement is done from the access panel or call station
- Broadcast can be done to specific speaker zones or all zones
- Announcement from telephone or radio via the interface





NPA – IP PA Unit

Modular IP amplifier with fully integrated features

- Exchangeable amplifier modules allow for a maximum output power of 2 x 300 W (600W max per unit)
- Up to 4 simultaneous and independent amplifier channels
- Up to 8 integrated, selectively addressable speaker circuits
- Highest availability due to redundant network interface
- Internal monitoring for voltage loss, short circuit, overload and excess temperature
- Intelligent backup control
- Optional speaker monitoring
- Integrated web interface

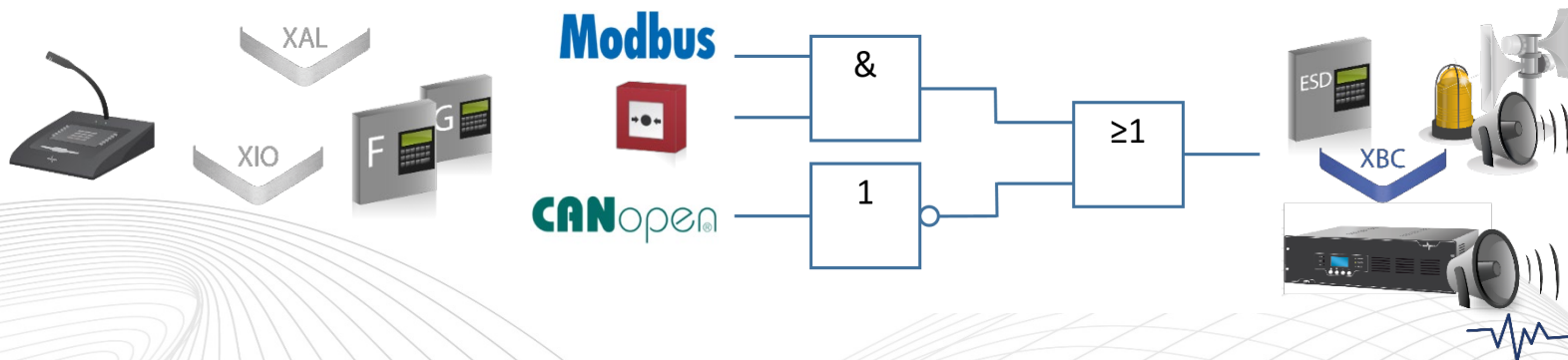
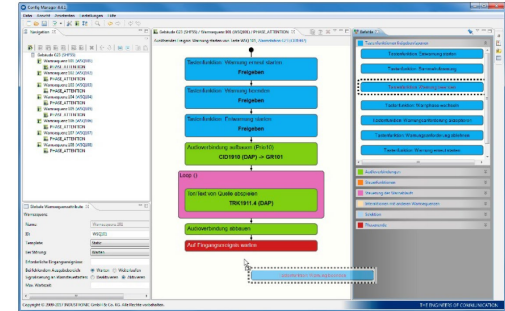




System Function – Public Address / General Alarm (PA/GA)

The function enables plant wide announcements & alarms mainly during emergencies

- Manual or automatic alarm activation
- Different alarms with different priority level
- Use of integrated logic function
- Configuration of adaptive warning sequences
- Scalable from simple warnings to complete plant evacuation scenarios
- Emergency speech or voice over alarm (VOA)

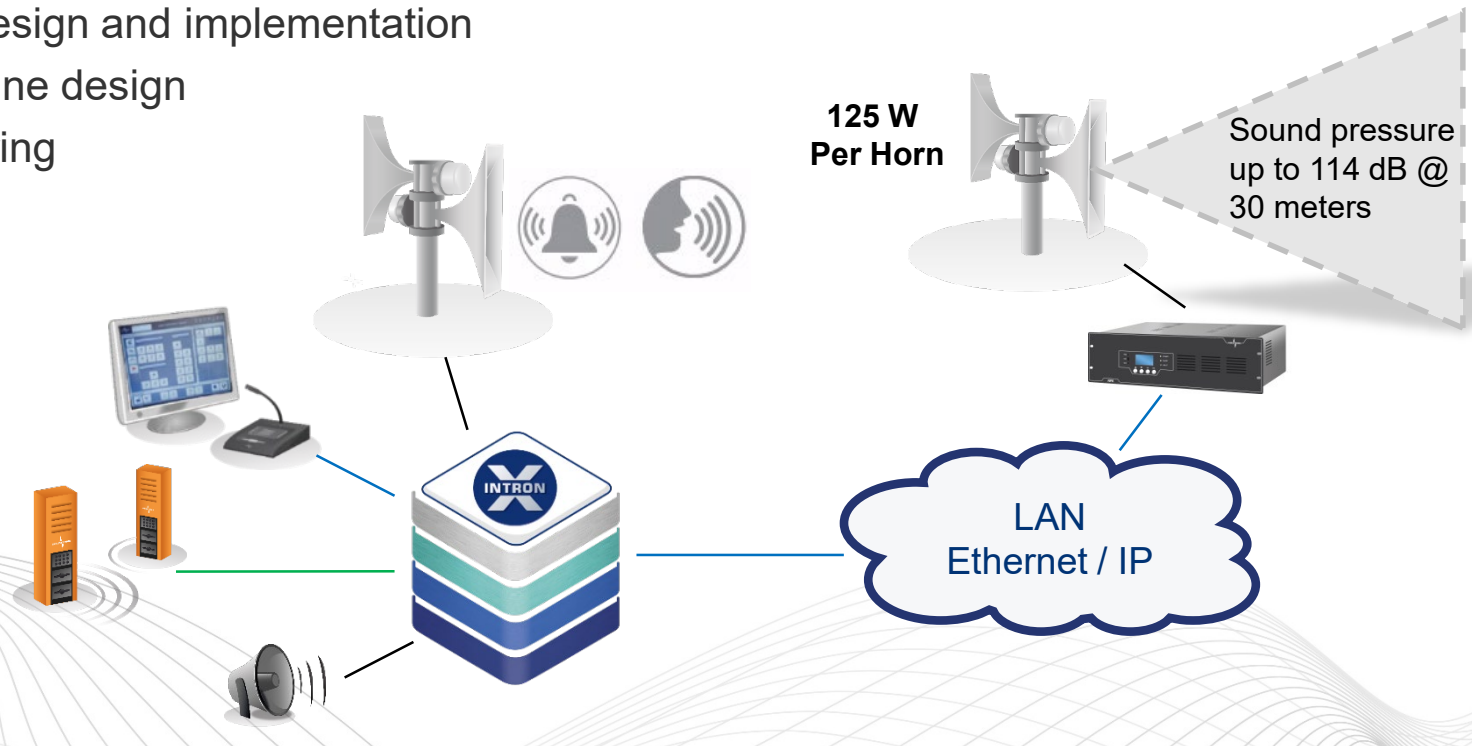




System Function – Wide Area Notification (Siren)

The function provides plant-wide alarms via high wattage siren horn(s) mainly during an emergency either by itself as an independent system or by complementing the PA/GA system.

- broadcasting of alarms, tones and voice announcements
- Excellent audio quality horns
- Easy design and implementation
- 100-V line design
- Monitoring





Activation Model



Apart from standard communication features, the functional scope of the system can be expanded at any time. You can choose features from the following categories:

System

Standard functions, connection of IP devices, redundancy functions

Terminal Devices

Applicable to AP, NCP (configurable touch screen), DUSTRON features, NPA (speaker line monitoring), XBC line monitoring

Functions

Special function like numerous and specific alarm sequences, conference channels, time control...

Interfaces

Special interfaces like SIP, SNMP, Modbus, CANopen, Email notification...





System Availability & Reliability

- As INDUSTRONIC systems are considered as critical systems which need to perform during an emergency, their availability and reliability is of paramount importance
- Specifications often require a system availability of at least 99.99% if not 99.9999%
- Reliability is achieved with modules with high MTBF time
- With interlocking redundancy mechanisms, complete systems with a MTBF time of more than 290000 hours can be realized
- Availability is accomplished via monitoring & redundancy design incorporated in the system
- All critical components, cablings & interfaces are monitored in real time
- All critical components should be with redundancy to avoid single point of failures which will impact the main operation of the system



Redundancy Concepts

Redundancy design is the critical aspect for the system to ensure its availability especially during an emergency. Various concepts of redundancy are:



Hot Standby System

- Maximum flexibility in redundant configuration of critical components
- 1+1 hot-standby configuration of the controller



A+B System (shared operation)

- Geographical redundancy by full duplication system nodes



A+B System / N+1 / N+N

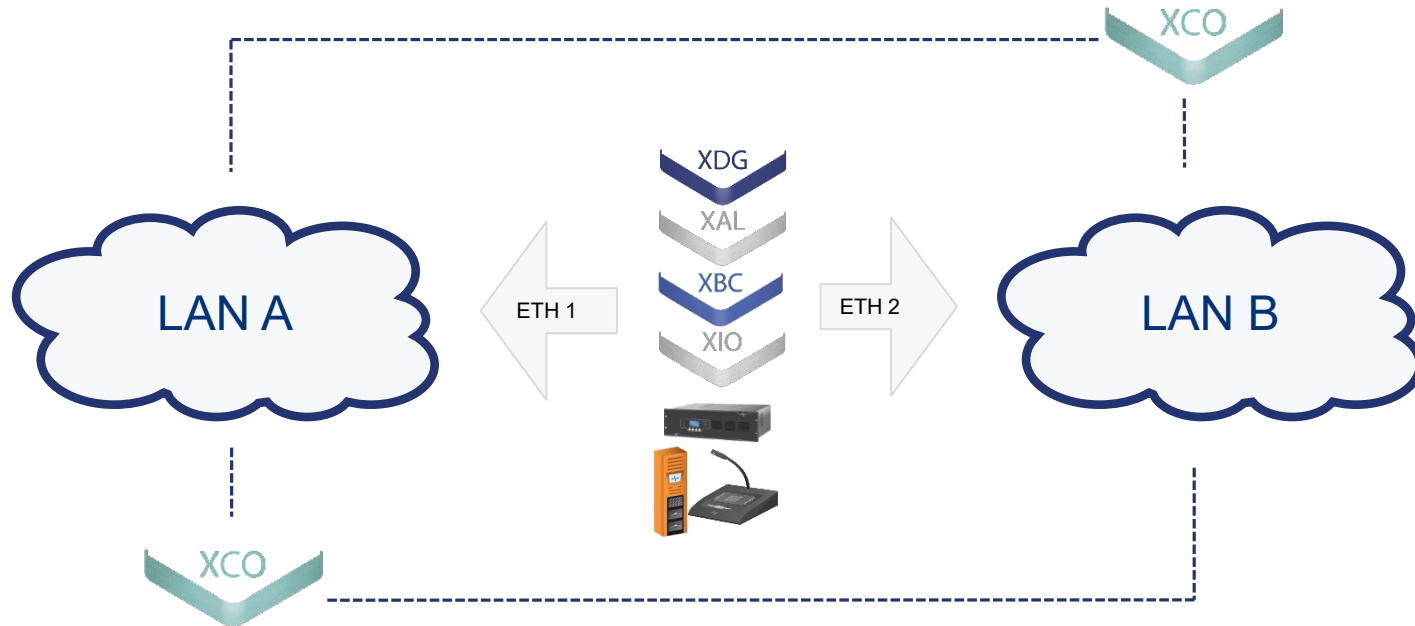
- Geographical redundancy with additional redundancy layer within each node

Further considerations:

- Redundant power supplies
(Batteries, UPS protected or dual mains feeds)
- Redundant links or cabling
(network infrastructure, device connectivity)



Network Redundancy



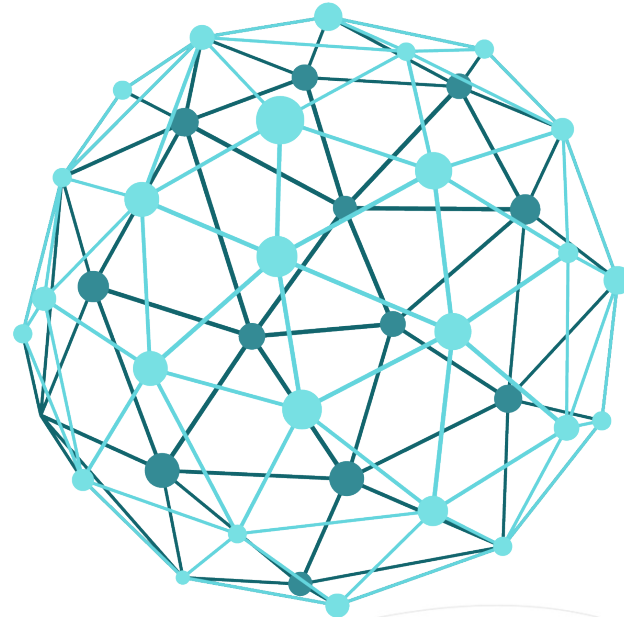
- All INTRON-X modules and terminal devices have dual Ethernet ports
- Every device is dual-homed connected in redundant networks
- Ideal for high redundancy systems, including Hot-Standby and A+B designs.
- Applicable to both centralized and decentralized system architectures.



System Architecture & Connectivity

The options of various system architectures and connectivity topology provides the flexibility when designing the system especially with the constraints of a fixed backbone infrastructure on site.

- Centralized design
- Decentralized design
- Ethernet (LAN)
- Star
- Ring
- Mesh
- Wireless

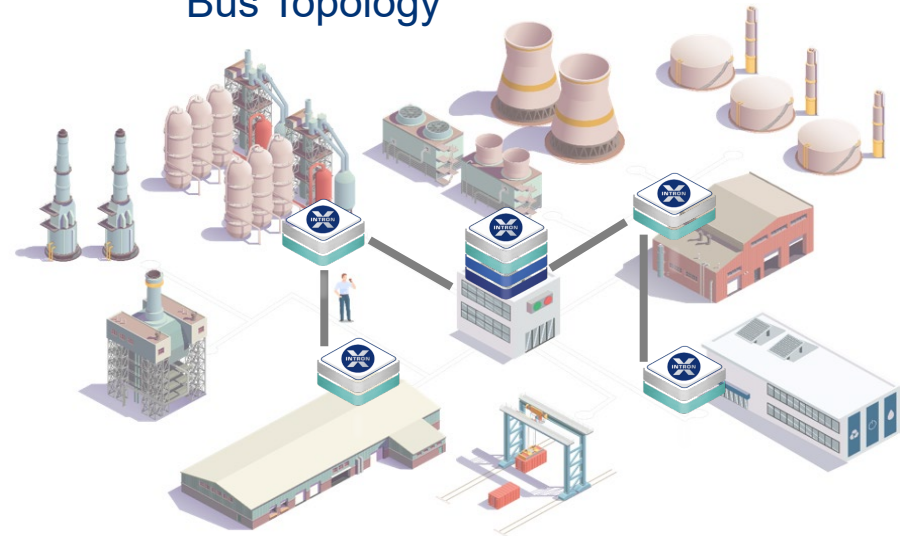




Star Topology



Bus Topology



Ring Topology

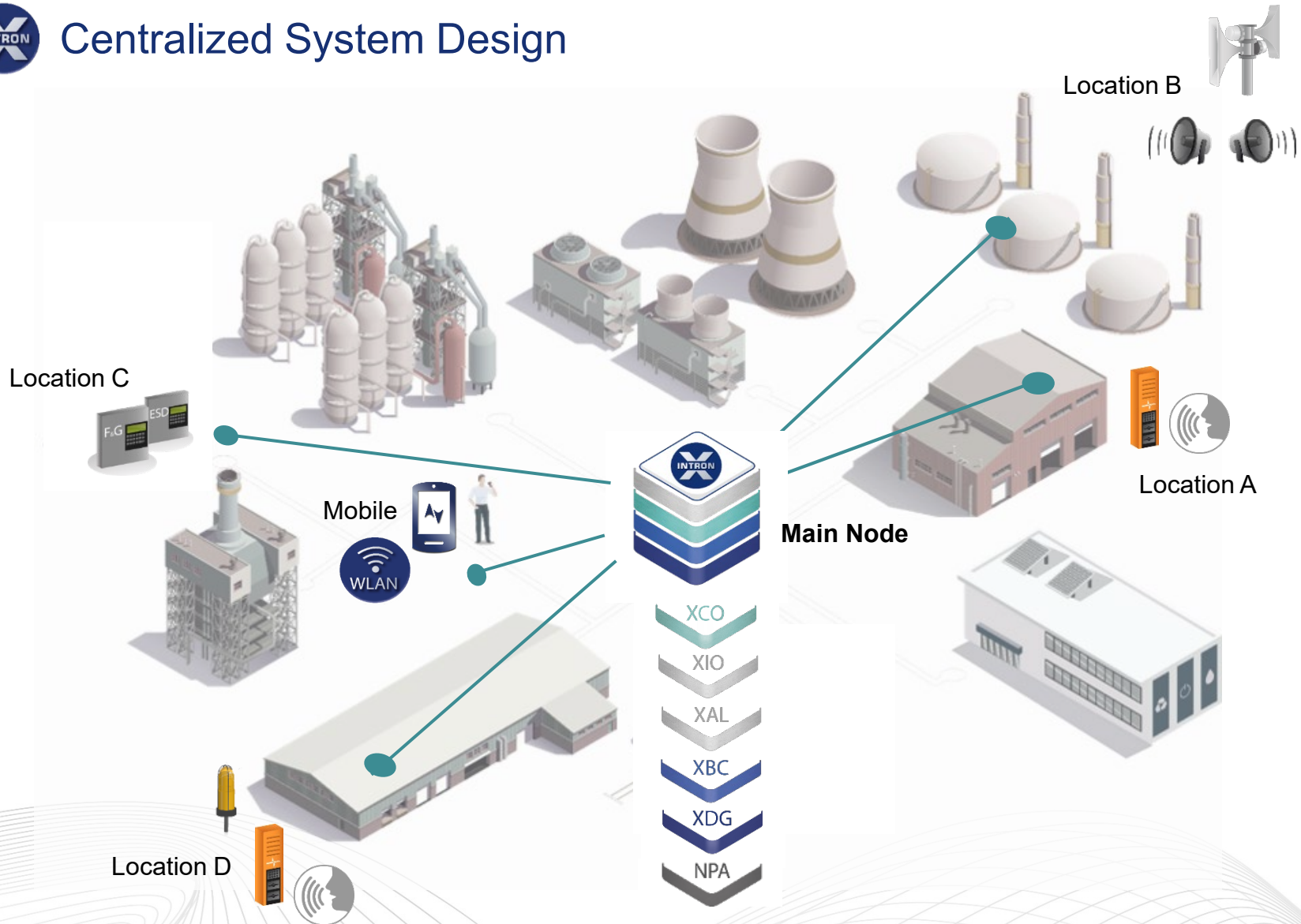


Mesh Topology



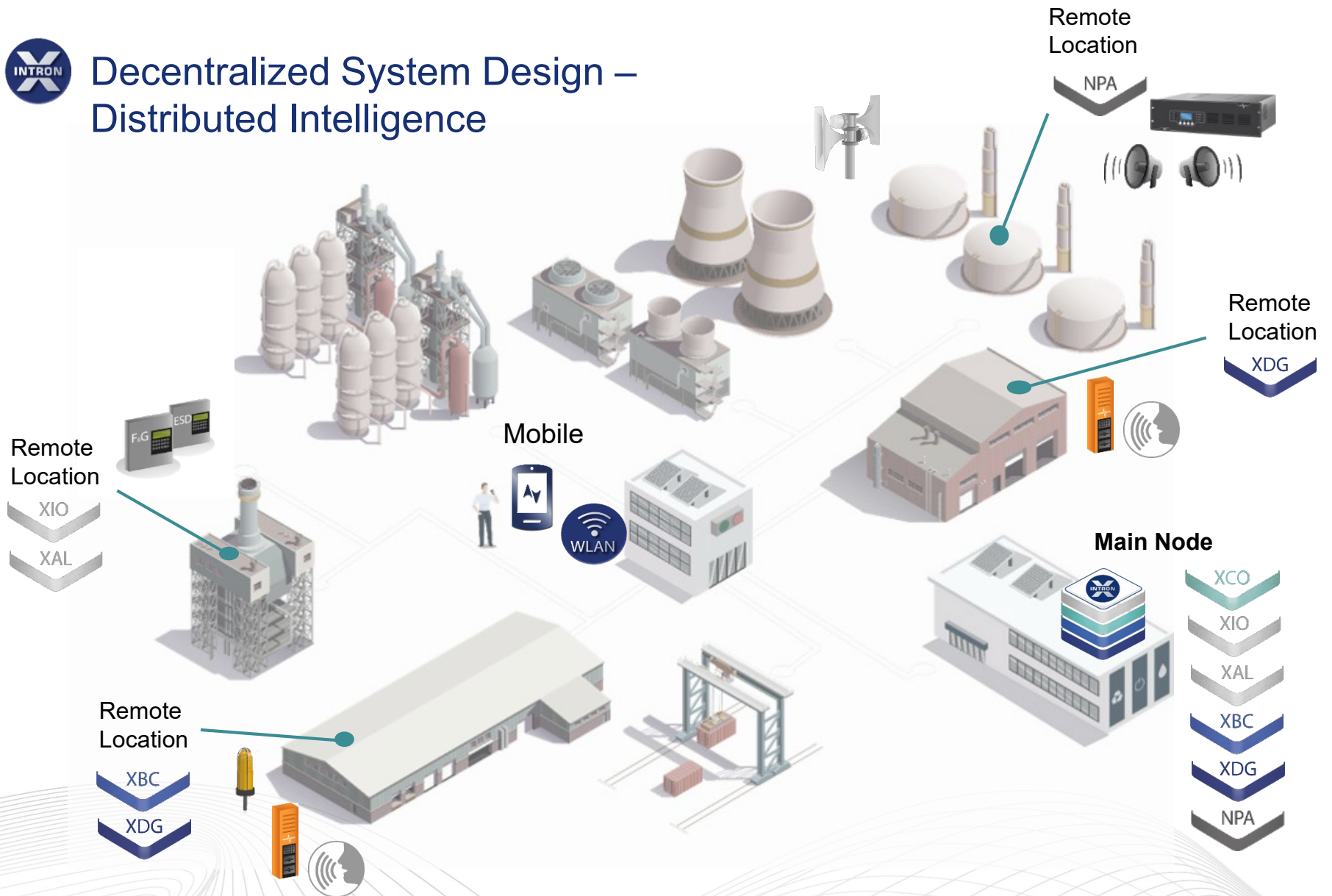


Centralized System Design



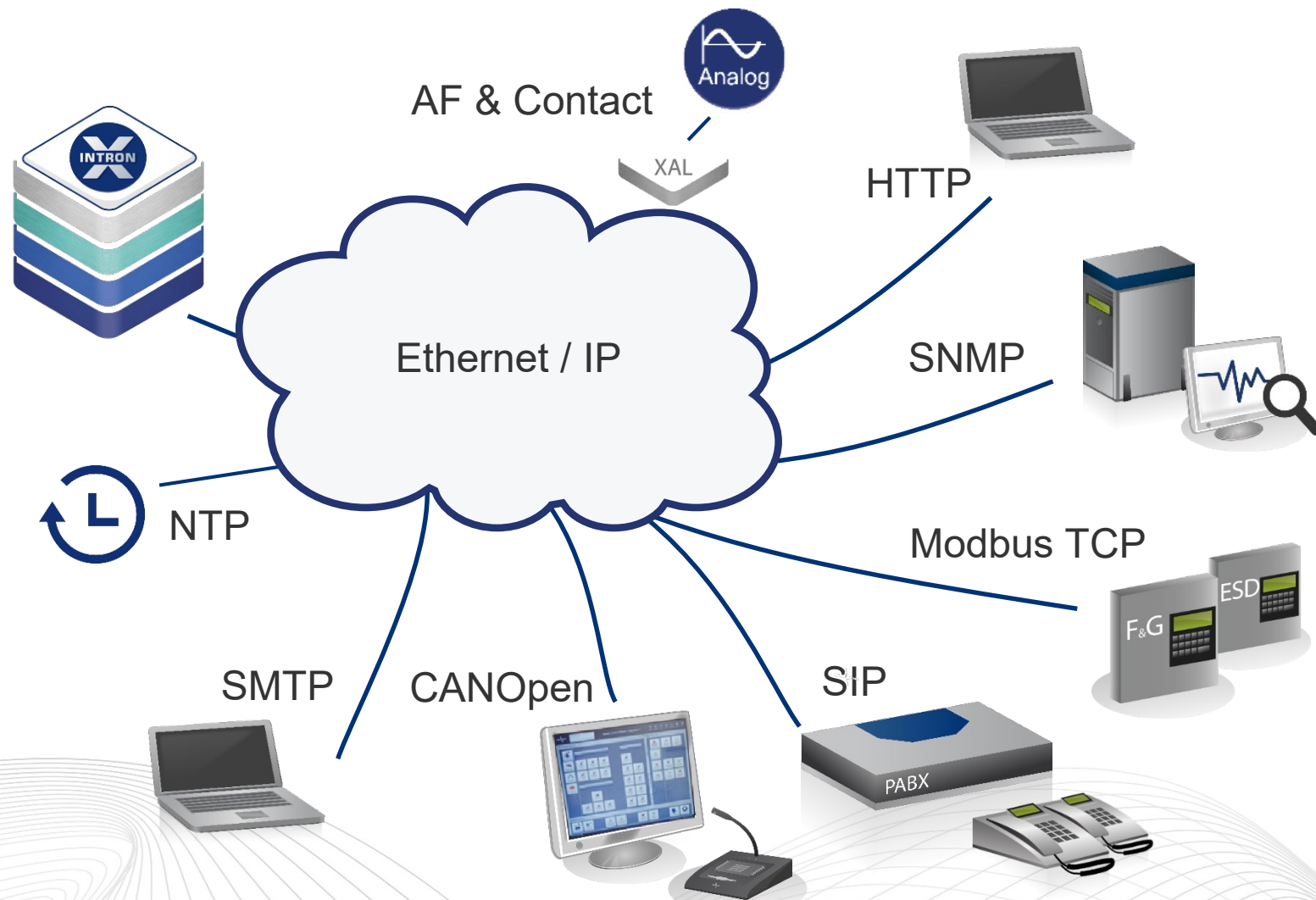


Decentralized System Design – Distributed Intelligence





Intelligent interfacing - Integration via Open Interfaces





Network



Technical requirements:

- 10/100/1000Base-TX Ethernet (IEEE 802.3)
- IPv4 network
- Quality-of-Service is recommended
- Low bandwidth required (approx. 100 kBit/s per active audio channel)



Cyber Security



- Hardened embedded Linux platform
- Encrypted file systems for protection against unauthorized access
- Integrated firewall (only services that are in use are activated at the interfaces)
- Different password-protected roles for login
- X-Controller (XCO) provides additional security mechanisms
 - Software protection via trusted platform module (TPM) (only authorized software can run on the XCO)
 - Physical separation of network segments possible via 4 Ethernet interfaces on the XCO (integrated gateway functionality)
 - Encrypted web access via https
- Cyber security standard IEC 62443 will be benchmark for industrial communication networks in the future



Overview INTRON-X Software Tools



Config Manager X



DUSTRON app



Network Control Panel (NCP)



INTRON-X
Service Tool (XST)



Web Interface

INTRON-X System Manager (under development)



Web Interface – Web Access to the X-Controller

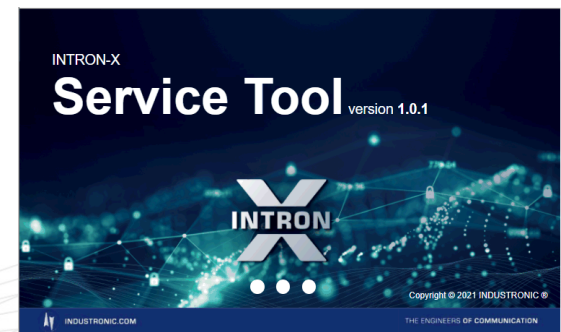
- Intuitive user interface which can be accessed using a standard web browser
- Monitoring and maintaining the system
- Status information and system status
- Diagnostic functions
- Configuration and system management
- Overview of all nodes within the INTRON-X system
- Different access levels and authorizations

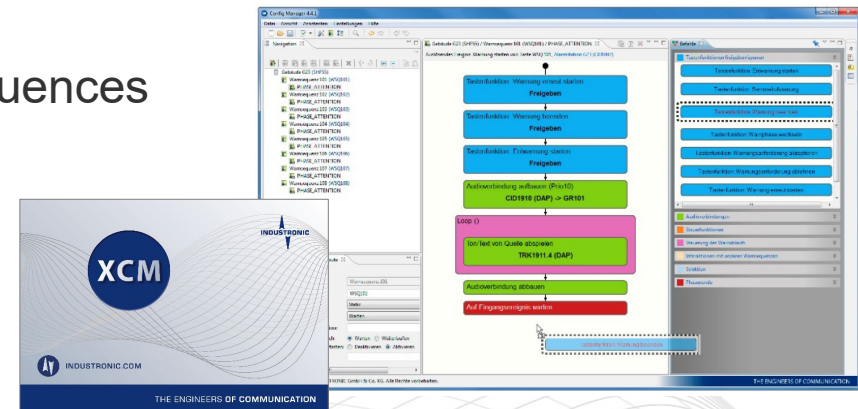
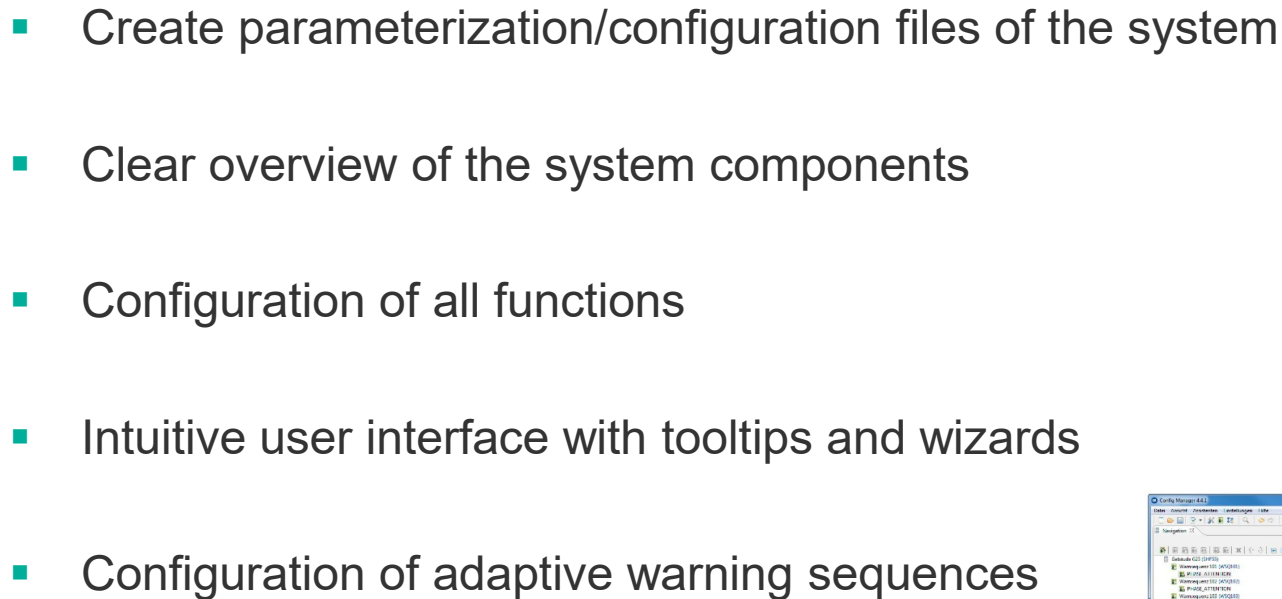




INTRON-X Service Tool

- Secure access to the IP components via local service interface or network
- Secure remote access to IP terminal devices via local service interface of the respective controller
- Parallel access to several IP components
- Intuitive user interface for commissioning and maintenance
- SW update and configuration
- Diagnostic and test functions







INTRON-X System Manager (under development)



- Comprehensive management solution for INDUSTRONIC systems
- Client/server architecture
- Several web clients possible (using a standard web browser)
- Centralized uploading of configurations and software updates
- Centralized backup of the entire system configuration
- Complete visualization of the current system status
- Automatic display of system events and faults in real time
- Fault history



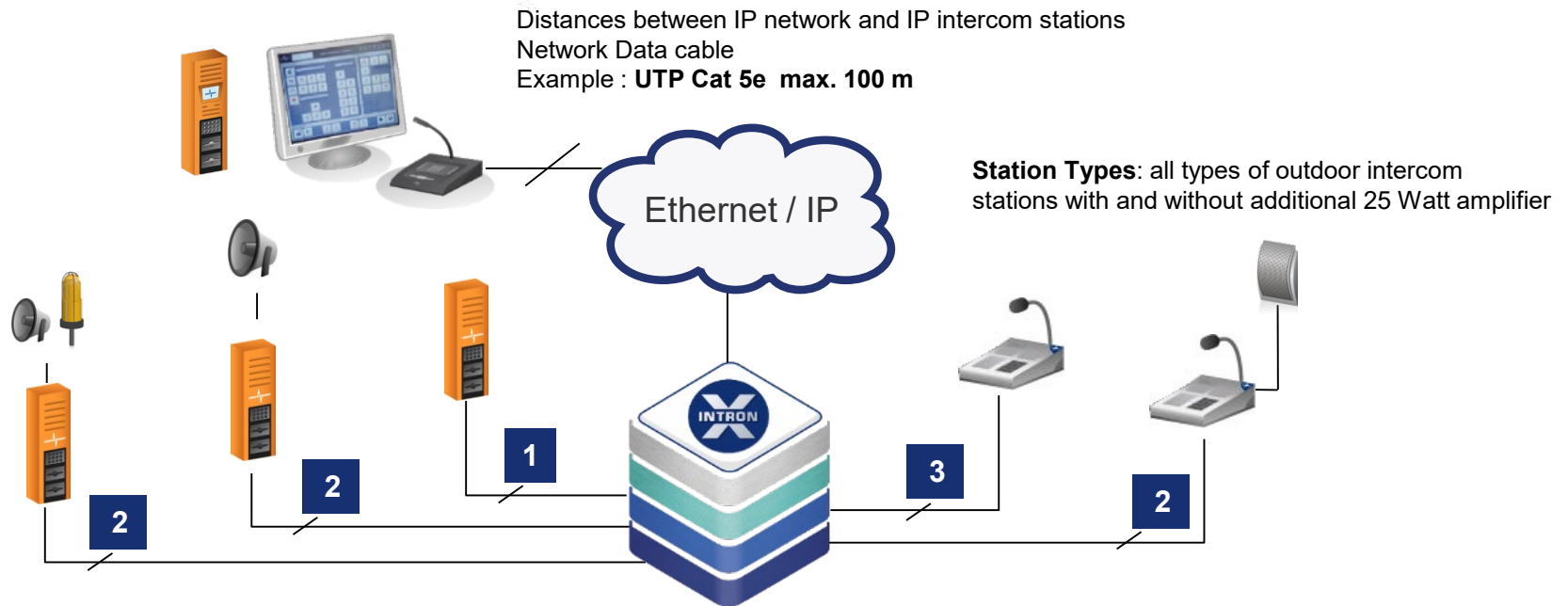
INDUSTRONIC Services

- Regular software updates
- Long-term support for our products and customer systems
- Worldwide on-site or remote service calls
- Network infrastructure design and deployment
- Upgrade services
- Technical Support Center
- Maintenance contracts
- Customized training





Cabling Guideline – Intercom Stations



1 Distances between cabinet and outdoor / Ex-proof intercom stations **without** additional amplifier
1 x 2 x 0,8 Ø; (1 pair) max. 4000 m

3 Distances between cabinet and master intercom stations **without** additional amplifier
2 x 2 x 0,8 Ø; (2 pair) max. 4000 m

2 Distances between cabinet and intercom stations **with** additional **amplifier**
for **speech and tone** signal application # for **speech** application only
2 x 2 x 0,8 Ø; (2 pairs) min. 500 m 2 x 2 x 0,8 Ø; (2 pairs) min. 1500 m
3 x 2 x 0,8 Ø; (3 pairs) min. 1500 m 3 x 2 x 0,8 Ø; (3 pairs) max. 4000 m
4 x 2 x 0,8 Ø; (4 pairs) min. 2500 m

Distances stated here apply to 60-V systems

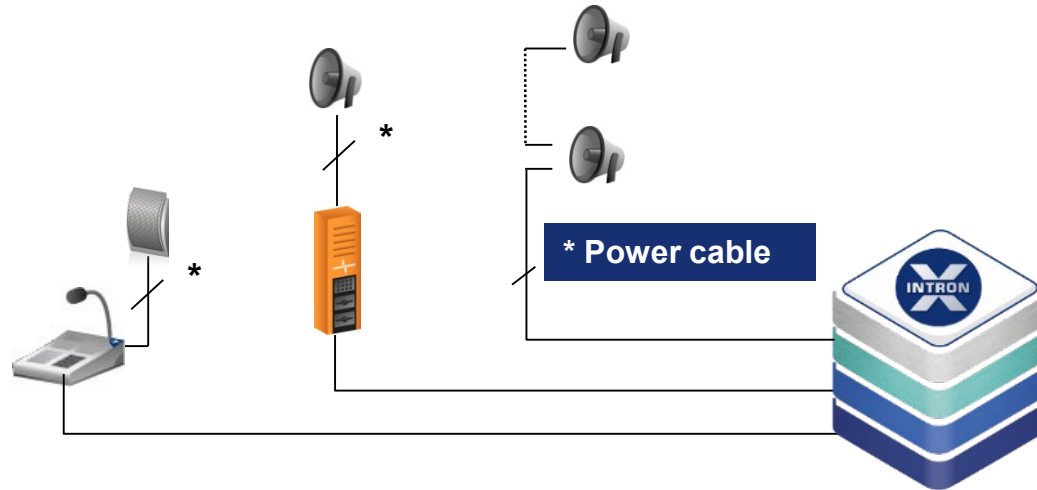
Please use twisted pair standard telecom cable!

Note : For more details please see our cabling guidelines





Cabling Guideline – Speakers



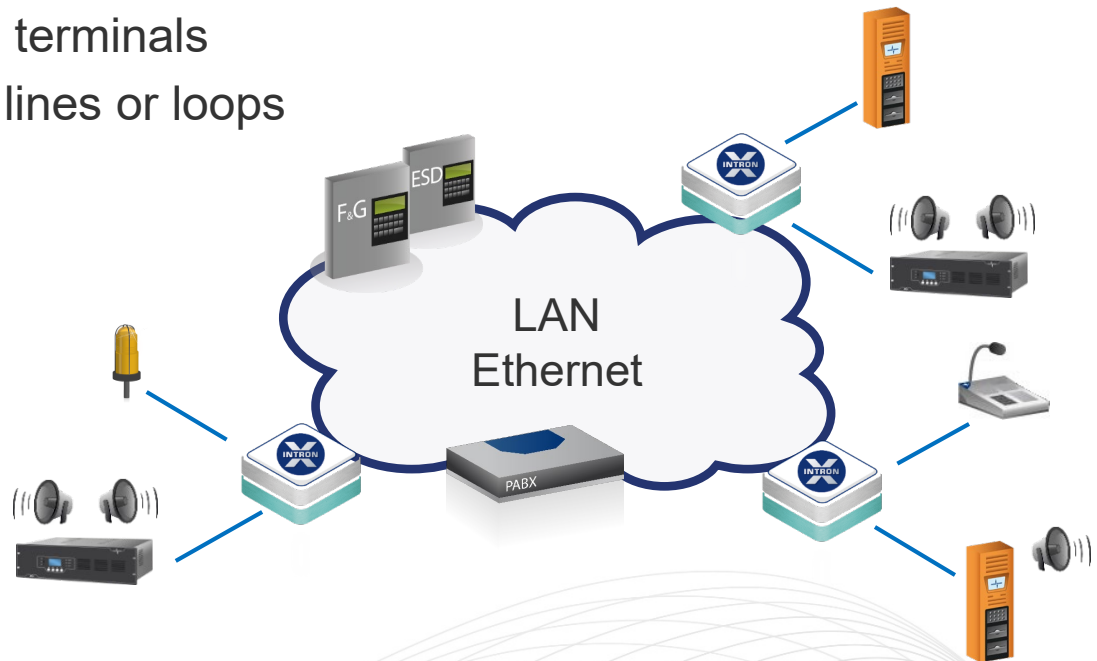
Cabling between cabinet / intercom station and loudspeakers depending on the length of cables and power of the loudspeakers the cross-section of wires are to be calculated as follows:

Voltage drop of cable	Length of cable	Power to transfer				cross-section of wire
		30 W	50 W	100 W	250 W	
- 2dB power loss (emergency and alarm application)	0... 400m	1,5mm ²	1,5mm ²	1,5mm ²	1,5mm ²	
	400...1100m	1,5mm ²	1,5mm ²	1,5mm ²	4mm ²	
	1100... 1700m	1,5mm ²	1,5mm ²	2,5mm ²	6mm ²	
	1700... 2900m	1,5mm ²	2,5mm ²	4mm ²	10mm ²	
	2900... 3600m	1,5mm ²	2,5mm ²	6mm ²		



Save Cabling in a Decentralized Design

- Use of the existing Network*
- One infrastructure – more applications
- Additional cabling only for „last mile“
 - Cat 6 for IP terminals
 - 2-/4-wire for digital terminals
 - 2-wire for speaker lines or loops



* For details please refer to general INTRON-X network requirements



Customers Benefits

End Users (Owners)	EPCs (Contractors)	System Integrators (SI)
System full of functions and features (customizable)	Flexible & multiple design options	Modular and easy to design
Centralized management for huge or multiple sites	Changes can be easily made during engineering	Simple to assemble that supports local assembly
Prolong life span of existing INTRON-D <i>plus</i> system	Save on cabling and installation cost	Can perform FAT & SAT with trained engineer
Pre & post project support from local partner	Valued design and engineering support	Close support from factory or subsidiaries
Ease on maintenance	Local support on project site during execution	
Ease of system expansion		



INDUSTRONIC Certified Quality



DIN EN
54-16

Fire detection and
fire alarm systems

DIN EN
50849

Sound systems for emergency purposes

NFPA 72

National Fire Alarm and Signaling Code

IEC
50695

PA-General-Emergency-Alarm-System,
Communication-System for marine
applications

DIN EN
81

Safety rules for the construction and
installation of lifts – Lifts for the transport
of persons and goods

DIN EN
81-20

Passenger and goods passenger lifts

DIN EN
81-28

Remote alarm on passenger and goods
passenger lifts



Thank you for your attention.

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