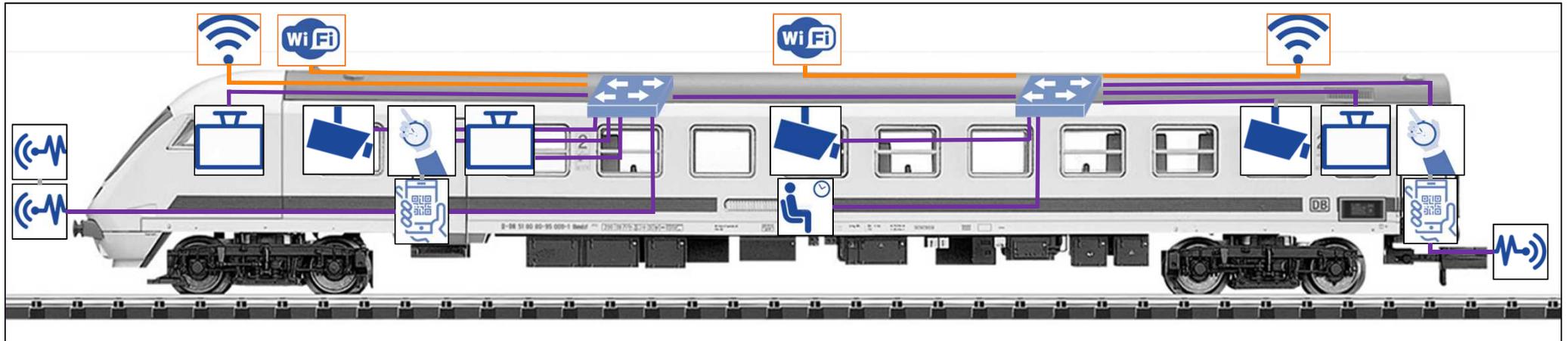# SPMD additional use cases
Transportation and
Industrial sensor network

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# Use Case: Transportation – Train / Tram Inside

Display (inside/outside)		WLAN Router / Router		
Sensors		Ticket Automat		
IP Camera (inside/outside) / Door Surveillance		Seating Reservation		
Cellular Router		Passenger Counter IP Speaker / SOS Terminal		

Single Pair Ethernet   4-pair Ethernet

Usecase: Train/Tram/Bus

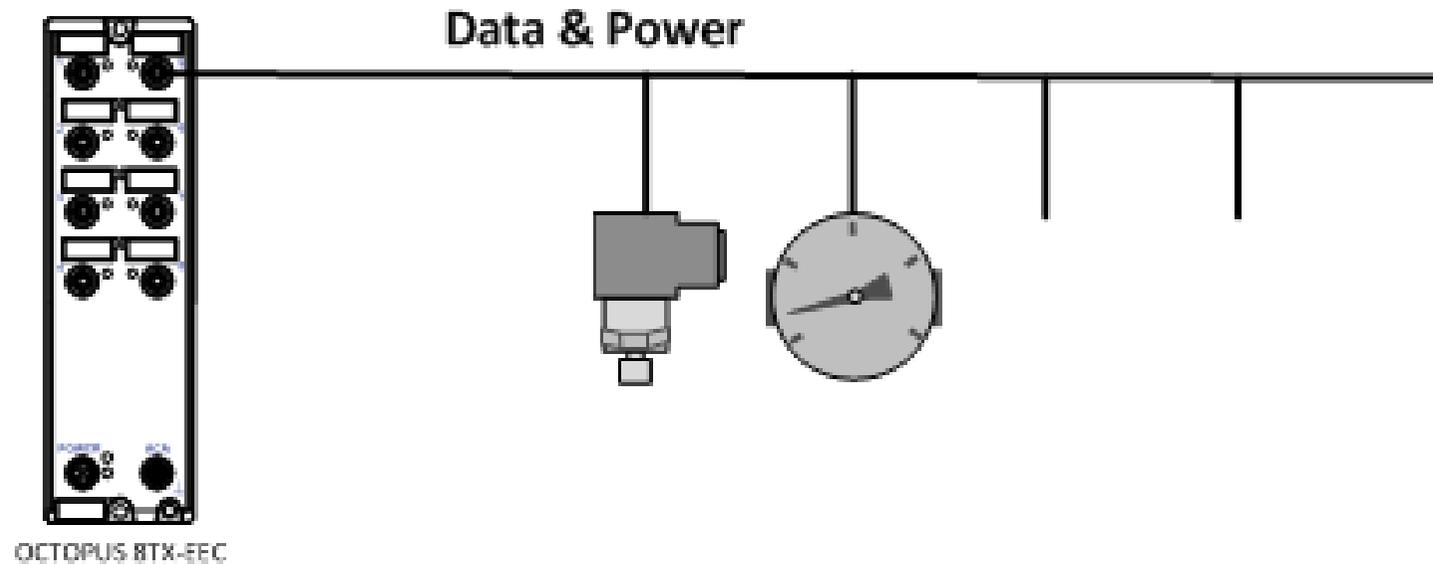| Item	Min Value	Desired value	Extra information
Supported nodes on one mixing segment		6	Passanger Counter, Stop Signal, Ticket automat, Door opener, SOS Terminal
Minimum supported cable length		25	
Acceptable cable gauges	AWG24/22		
Required power for a node	1W-30W	40-50W	In Summary without IP Speaker (no PoDL)
Required initial power allocation		2W	
60V voltage OK ?	24V		
Interoperability level for the application	Engineered		
Pass through or T connection	T-Connection		
Hotpluggability	No		
Possible market (in #nodes/year)	260 000 multidrop lines /year		IHS for 2020 with annual growth of 9%
TSN/PTP	Yes		Pre-emption

Usecase: Train/Tram- Door

Data & Power

Door Surveillance | Passanger Counter | Door Opener | IP Speaker | Stop Signal
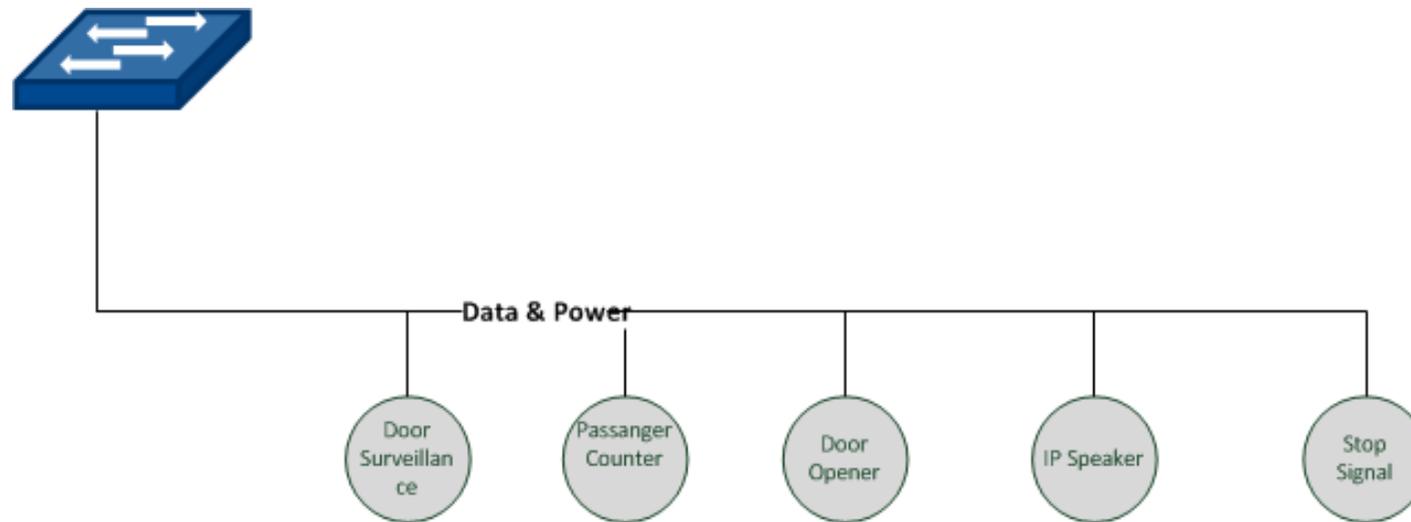
Usecase: Industrial Sensor Network

Item	Min Value	Desired value	Extra information
Supported nodes on one mixing segment	10	Up to 20	
Minimum supported cable length		50/75m	
Acceptable cable gauges	AWG24/22		
Required power for a node	1,5W	10W	
Required initial power allocation	0,5W	2W	
60V voltage OK ?	24V		
Interoperability level for the application	Engineered		
Pass through or T connection	T-Connection		
Hotpluggability	required		
Possible market (in #nodes/year)	1 Mio. multidrop lines/year		
TSN/PTP	Yes both required		

Usecase: Industrial Sensor Network

Wlan

Cloud

Office

Factory / Office Level

Field Level / Production Level

S/A with switch functionality

Multi Drop

PLC - B

PLC - A

Sensor/Actuator

Sensor/Actuator

Sensor/Actuator

Sensor/Actuator

Opt.

Opt.

SPE

SPE

Gateway / Switch

Opt.

Switch

Switch

SPE

IO - Modul

IO - Modul

SPE

1000Mbit/s

SPE

SPE

Power-Supply

DC / PWR

SPE - ports

IO classic wiring

Actuator

SPE – Redundancy Ring

Opt. Copper or LWL

Usecase: Industrial Sensor Network

Data & Power

OCTOPUS 8TX-EEC

Item	Description
Supported nodes on one mixing segment	Indicate the numbers of nodes on a single mixing segment. The minimum reflects the number of nodes needed for the usecase to make sense. The desired value represents a natural fit for the application. Both numbers could be the same.
Minimum supported cable length	Is the length you need between the two furthest nodes on the mixing segment.
Acceptable cable gauges	What cable gauges can be accepted for the application (consider cost, size, bend radius, …)
Required power for a node	How much power is needed in the node to run the application. This is the power level as measured at the connector of the device. Note that there may be a rectifier or other elements that cause some loss (2% to 5% typical).
60V voltage OK ?	Is it acceptable for the input voltage to be up to 60V ? If not, what is the reason ?
Required initial power allocation	Because this is a bus powered system, a node needs to be permitted to draw some amount of power after being plugged in. This power is used to communicate with the PSE about the power requirements. The system should be able to operate it's PHY with this power. How much power do you foresee to need for this. This is different from the "Required power for a node" which is about the complete power need of the device.
Interoperability level for the application	Choose between "plug&play" or "engineered" system. Plug & play means that a compliant device works when connected to a network of other compliant devices. There is no need for configuration or to verify if devices will be compatible or not. Engineered system means that you will use the standard within your own products or that the end user can determine which devices will work in the system.
Pass through or T connection	See slide 4-6 of http://grouper.ieee.org/groups/802/3/SPMD/public/sep19/spmd_cjones_01_0919.pdf If the application cannot be equipped with two connectors, select T connection. If it must be possible to live connect a new node without disconnecting other nodes, also select T connection.
Hotpluggability	Should it be supported to connect new devices while the bus is powered and guaranteed that this does not cause devices to be interrupted (eg. Reboot, lose long stretches of data). If not required, select no.
Possible market size	Potential market expressed in number of nodes. Do not express this in currency of any kind due to IEEE SA rules.

Thank You