4.6.1 Introduction

Industrial automation applications make use of different traffic schemes/patterns for different functionalities (for example, parameterization, control, alarming). The various traffic patterns have different characteristics and thus, impose different requirements on a TSN network. To specify these traffic types, a two-step approach is used:

1.) First define characteristics of generic traffic type (traffic-type-categories) and
2.) Second define instances of the generic types, i.e. the traffic types.

This two-step approach allows a clear differentiation between characteristics as seen from the "Ethernet interface" point of view and "application" point of view. Traffic-type-categories allow different IEEE 802 feature selections to achieve the specified goals. Four traffic-types-categories are identified in Industrial Automation (IA) systems:

1. IA time-aware stream
2. IA stream
3. IA traffic engineered non-stream
4. IA non-stream

IA time-aware stream

The characteristics of this traffic are shown in Table X.

Characteristics	
Cyclic	Yes
Data delivery requirement	Deadline or latency
Time-triggered transmit	Yes

IA stream

The characteristics of this traffic are shown in Table X.

Characteristics	
Cyclic	Yes
Data delivery requirement	Latency
Time-triggered transmit	Optional

IA traffic engineered non-stream

The characteristics of this traffic are shown in Table X.

Characteristics	
Cyclic	No
Data delivery requirement	Latency
Time-triggered transmit	No

IA non-stream

The characteristics of this traffic are shown in Table X.

Characteristics	
Cyclic	No
Data delivery requirement	N/A
Time-triggered transmit	No

Table 3 summarizes relevant industrial automation traffic types and their associated characteristics. In an industrial automation system, applications such as audio or video would utilize one of these traffic types. Traffic types are further described in 4.6.3.

Table 1 – Industrial automation traffic types summary

Traffic type name	Cyclic	Data delivery requirements	Time-triggered transmit	Traffic-type-category
Isochronous	Yes	Deadline	Yes	IA time-aware-stream
Cyclic-Synchronous	Yes	Latency	Yes	IA time-aware-stream
Cyclic-Asynchronous	Yes	Latency	No	IA stream
Alarms and Events	No	Latency	No	IA traffic engineered non-stream
Configuration & Diagnostics	No	Latency	No	IA traffic engineered non-stream
Network Control	Optional	Latency	No	IA traffic engineered non-stream
Best Effort	No	N/A	No	IA non-stream

Traffic class to traffic type mapping

The following Table provides an example for the usage of traffic classes based on the traffic type-categories :

Traffic class	Traffic Type
7	Isochronous
6	Cyclic-Synchronous
5	Cyclic-Asynchronous
4	Network Control
3	Alarms and Events
2	Configuration & Diagnostics
1	Best Effort
0	Best Effort

Traffic-Type- categories definition allows different IEEE 802 feature selections to achieve specified goals. Moreover it helps in identification of the traffic protection mechansims. Adherence to this example of a common mapping helps minimize potential conflicts between traffic types.