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What are the Goals of 802.1 TSN ?
How can we achieve them ?

Markus Jochim
General Motors Research & Development

Do we have a common view on the
scope & objectives of 802.1 TSN?

What is it that we are trying to
achieve?

Why this question ?

- Discussion during the Orlando Plenary around:
 - What is it we are trying to achieve ?
 - How much / how little do we want to standardize ?
 - Do we want a complete standardized set of mechanisms, or just the bare minimum ?

Customer perspective . . .

Objectives:

- Standardize a **comprehensive set** of mechanisms to support the implementation of **time critical** and **safety critical** communication.
- The standard must be **widely accepted** and recognized to ensure availability of multiple implementations on the market.
- A single cross industry standard (**automotive and industrial control**) is desirable (Economies of scale !).
- The standard needs to **anticipate future needs**.
Observe trends... Anticipate needs... Generate demand by offering solutions !
- The standard and implementations need to be **available within a reasonable time**.

5 Objectives... Discussed on the following slides...

Toolbox of Mechanisms

Comprehensive **Toolbox of Mechanisms** for Implementing Time and Safety Critical Communication systems

Scheduled Traffic	Ultra low latency, Highly deterministic, QoS, Planning & Flexibility issues, Adequate for most challenging applications.
Flexible Automotive / Industrial Control Traffic Class	Low latency, QoS, Flexible, Goal Adequate for the majority of control applications. Ongoing discussion in 802.1TSN: <i>BLS? Peristaltic? Urgency based? Per ingress shaping?</i>
Seamless Redundancy	Safety critical control.
Ingress Policing	Safety critical, Fault containment, Single point of failure.
Fault Tolerant Clock Sync	Safety critical, Fault containment.
Adequate support for reservations	Automotive requirements currently under discussion (=> AAA2C)

What can we do to establish such a set of mechanisms as a widely accepted standard ?



Critical Mass... The 802.1TSN document !

- Make sure the standard is implemented on a broad basis:
 - If mechanisms are defined in 802.1Q, the availability of a broad basis of implementations is very likely ✓
Specifying in 802.1Q is desirable !
 - There are cases, where 802.1Q may not be the best choice.
E.g.: Concerns of industries that don't need the mechanism.
 - What are the options then ?
 - Defining a separate standard document for each mechanism is undesirable !
 - A single mechanism will not have the “Critical Mass” required to guarantee availability of implementations.
 - Define a single 802.1TSN* document instead!

* Will be called “802.1TSN” on the following slides even though the actual name will obviously need to follow IEEE naming conventions.

A single 802.1 TSN Document

- Not all mechanisms in our toolbox need to be specified within the 802.1 TSN document.



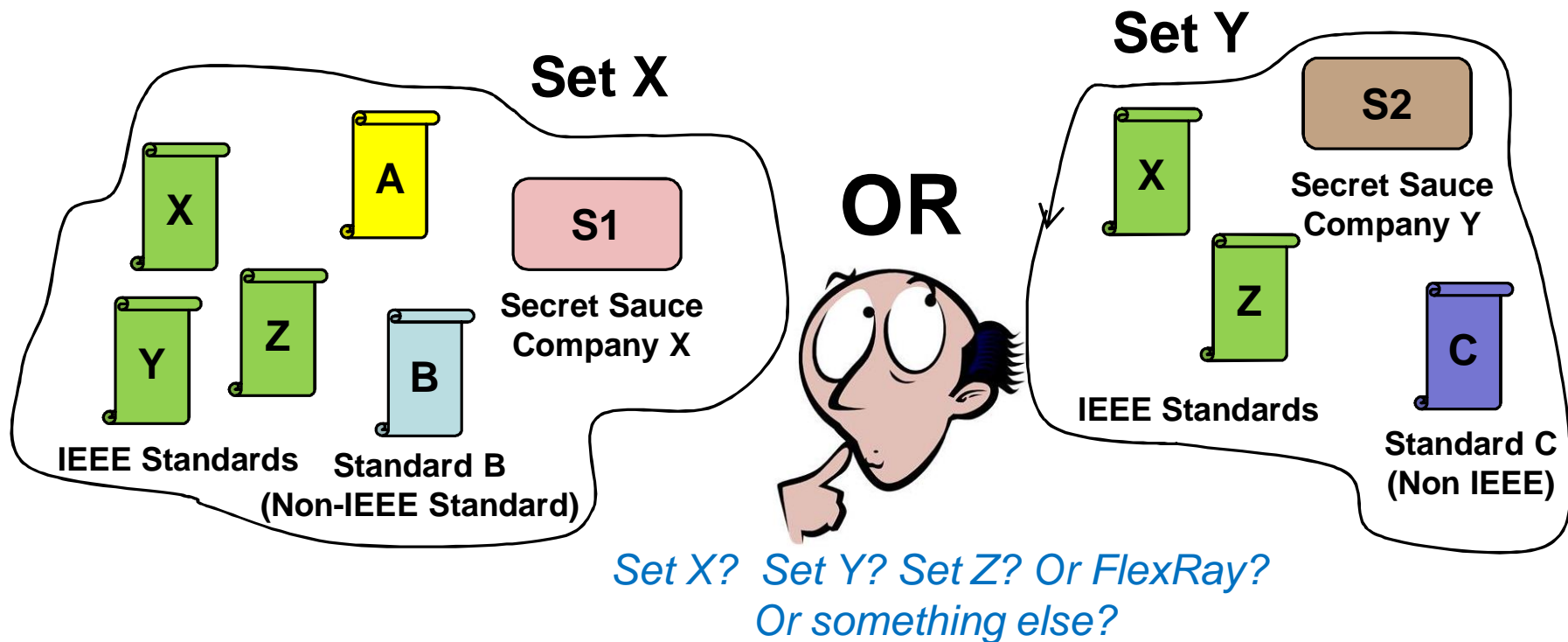
- Mechanisms can also be defined by reference to be mandatory for 802.1 TSN compliant implementations.
- Goal: 802.1 TSN as a single document that defines / bundles the set of mechanisms that need to be implemented to be “attractive” for time & safety critical control in Automotive and Industrial.

A single 802.1 TSN Document

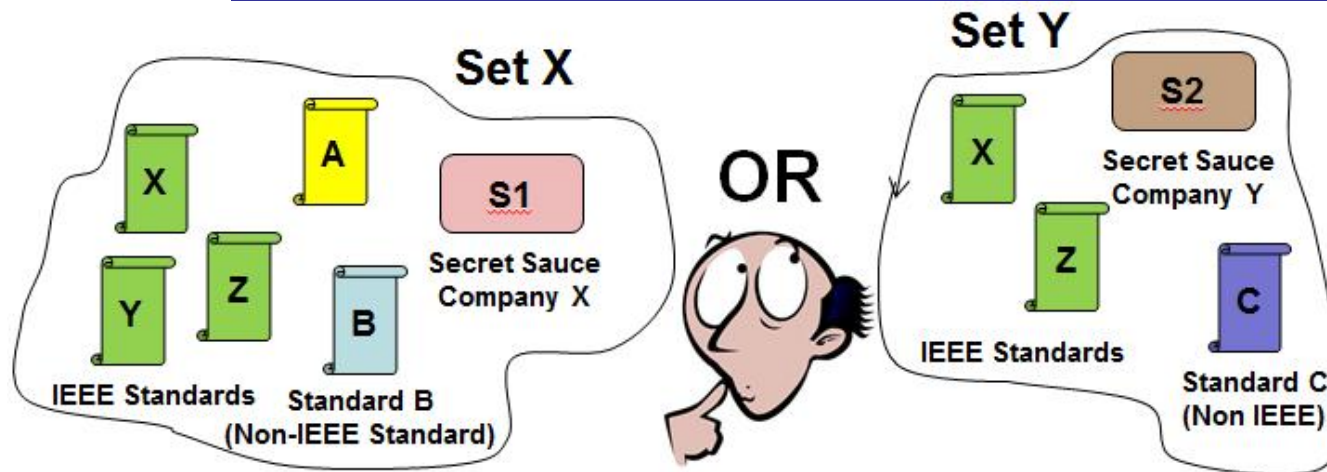
A single 802.1 TSN standard is easier to establish / communicate as “**the standard**” for our use cases & industries.

Let's look at the alternative ... (1/2)

- The alternative is a **loose collection** of IEEE standards that can potentially be complemented by a loose collection of non-IEEE standards and some non-standardized mechanisms.



Let's look at the alternative . . . (2/2)



- Users: *What should we use / base our serial data strategies on? What will be available in 5 years? Will there be a sufficiently broad offer available in the market? Is there a mainstream solution that a sufficient number of OEMs can agree on?*
- Implementers: *What should we offer / prepare for? What will the market accept?*

There is a lot of uncertainty . . .

. . . which often results in indecision and slow progress !

Uncertainty for Implementer & User

Situation for the Implementer:

- Users will not be able to tell the implementer what they will need 3 years down the road!
- 10 Users will have 20 opinions on what may or may not be needed.
- And not too much progress is made ...

Three years go by ...

Three years later . . .

- The user has plans for a new application program. . .
- . . . and surprisingly . . . it is very urgent ! ;-)
- The user “suddenly” has a need for a specific set of **standardized mechanisms** required to solve his particular problem !
- Unfortunately these standardized mechanisms **aren't available from multiple sources**.
- If the resulting risk (**technology or business**) for the project is too high, the user falls back to another technology (e.g. FlexRay, CAN FD, . . .) if that is considered less risky.



I have one more slide with some questions, thoughts and observations . . . but let's first discuss the main points that have been presented so far:

- Standardize a toolbox / a comprehensive set of mechanisms.
- Toolbox covers current and future demand !
Observe trends & anticipate future demand !
- Single standard for Automotive & Industrial.
- Single 802.1 TSN document that bundles the required mechanisms into a single standard for time & safety critical Ethernet based communication in both industries.
- Widely accepted... since sufficiently discussed and agreed upon!

Some additional thoughts & observations

- Roadmap / Timing for TSN standards is unclear.
This again... causes uncertainty! Can / should we address this somehow?
- Just an observation:
There is some magic in some of our decision processes ;-)
E.g. for deciding which technical proposals are worth and mature enough for a PAR.