SIEMENS

BEDSIDE DEVICE COMMUNICATION

A System Integrator's Perspective

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WHY STANDARDIZE?

CURRENT SITUATION

- The current situation, without standards, is a ‘disaster’, specially for system integrators.
- Most devices provide either RS-232 or analog outputs for system integration purposes.
- Each manufacturer’s Upper Layers (i.e. message format) is different.
- Even the use of a popular Lower Layer (like RS-232) is problematic.

Lets take a closer look at ‘legacy’ uses of the RS-232 based lower layers…..

CURRENT SITUATION - Physical Layer

- RS-232 Connectors
  - 9 Pin Subminiature-D Male
  - 9 Pin Subminiature-D Female
  - 25 Pin Subminiature-D Male
  - 25 Pin Subminiature-D Female
  - 37 Pin Subminiature-D Male
- 5 commonly used connector types, other types available such as RJ-11, High density types, etc.
- Baxter Vigilance uses different connector in US than in Europe!

CURRENT SITUATION - Link Layer

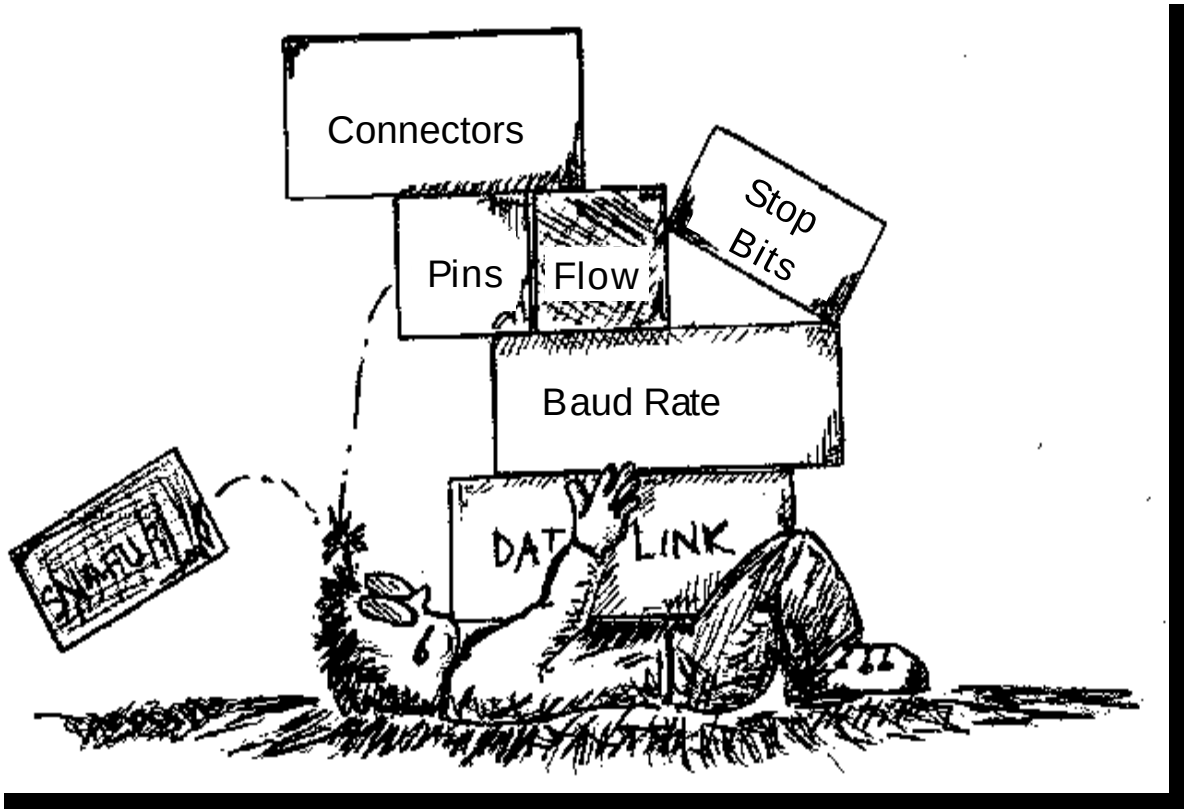
- RS-232 Baud Rates -
  - 1200 Baud, 4800 Baud, 9600 Baud, 19,200 Baud, ...
- RS-232 Byte Representations -
  - 7 bits Even Parity, 7 bits Odd Parity, 8 bits No Parity
- RS-232 Signaling Standards -
  - RS-232, RS-422, RS-423, RS-485
- RS-232 Stop Bits -
  - 1 Stop Bit, 2 Stop Bits
- RS-232 Flow Control
  - None, RTS / CTS, ENQ / ACK, XOn / Xoff, etc.

STOP THE INSANITY!!

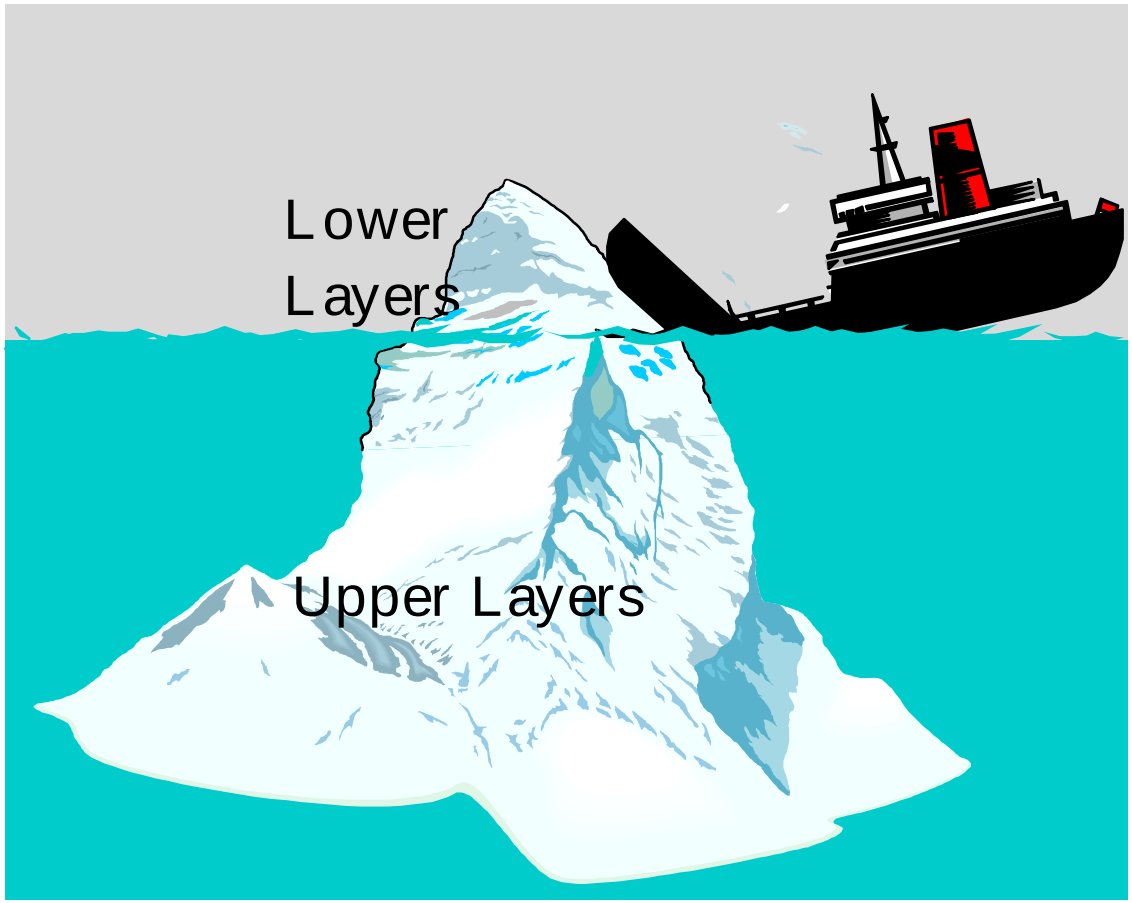
- Any given RS-232 based implementation can choose from;
  - 5 Different Connector Styles
  - 4 Different Baud Rates
  - 3 Different Parity Options
  - 4 Signaling Standards
  - 2 Different Stop Bit Options
  - 4 Different Flow Control Options

ANY ONE OF 1,920 DIFFERENT POSSIBILITIES!!

A HEAVY BURDEN



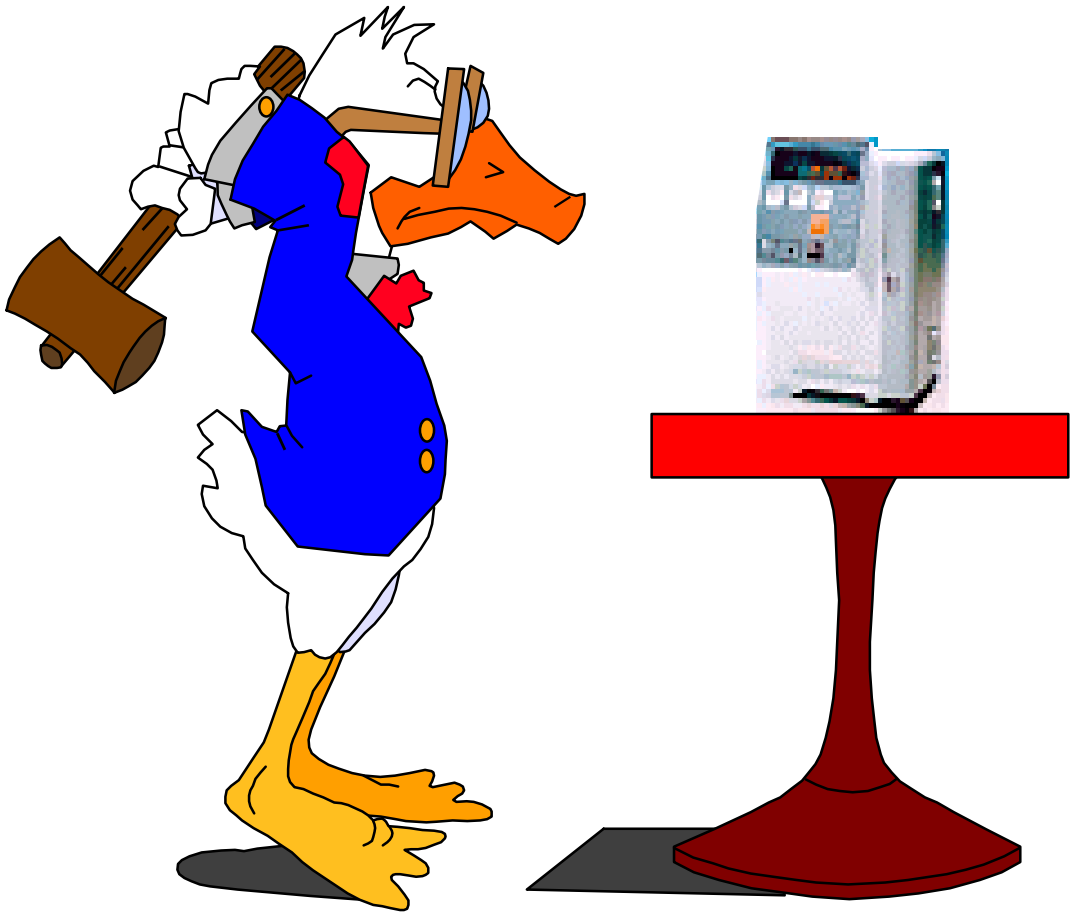
JUST THE TIP OF THE ICEBERG!



THE CONSEQUENCE

- Redundant Implementation:
  - The system integrator must interface to each new device from the bottom up. This requires either 'capturing' data or obtaining a device to test with.
- Redundant Verification:
  - The system integrator must verify that newer SW does not 'break' what worked in the older versions.
- Liability:
  - The system integrator must also deal with device manufacturers updating their own software protocols which may not be backward compatible.

THE CONSEQUENCE



This engineer has seen one too many interface protocols …….

IMPACT ON THE USER

- The System Integrators try to hide the pain from the end-user as much as possible.
- However, the current state of affairs does impact the user;
  - Device interfaces for products with new S/W protocols take a considerable time before they are available to the public.
  - Current device interface solutions cost a considerable amount of money to develop, to manufacture and, ultimately, to purchase.

BENEFITS OF STANDARDIZATION

- Reduces cost, by eliminating conv[illegible]
- Reduces system integrati[illegible] co[illegible]s
- Immediate suppo[illegible] [illegible]w [illegible]evic[illegible]s
- Easier a[illegible] [illegible] a[illegible] [illegible] device[illegible]
- Third [illegible] come available
- [illegible] be[illegible] [illegible]n [illegible]egral part of the network;
  - [illegible]vice management
  - [illegible]e access to data and error logs
- C[illegible]tical mass for 3rd parties to develop vendor neutral products and support.

Specify IEEE1073!

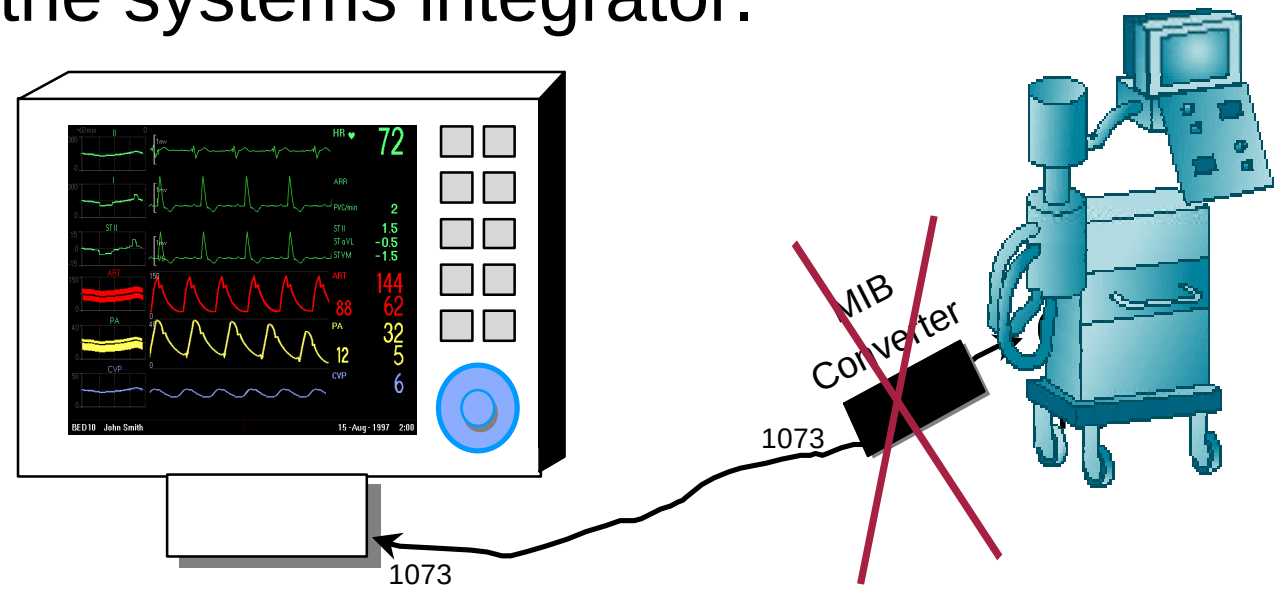
SIEMENS APPROACH to IEEE 1073

INTEGRATION APPROACH - SIEMENS

- SIEMENS currently uses protocol converters, based on the IEEE 1073 standard.
- These protocol converters are designed to to be added to the instrument, not the monitor. This creates a ‘virtual MIB’ device.
- The protocol converters are not device specific.
- SIEMENS protocol converters are field upgradeable to add support for new device interfaces as required.

SIEMENS APPROACH

- MIB Protocol Converter is a ‘temporary’ phase.
- Goal is to eliminate protocol converters.
- Goal is to reduce cost to the end-user, and eliminate constant implementation headaches for the systems integrator.



SIEMENS' COMMITMENT

Since late 1996, SIEMENS is the only company that has been shipping products based on the IEEE 1073 standard!

We will continue to support IEEE 1073 as it evolves.

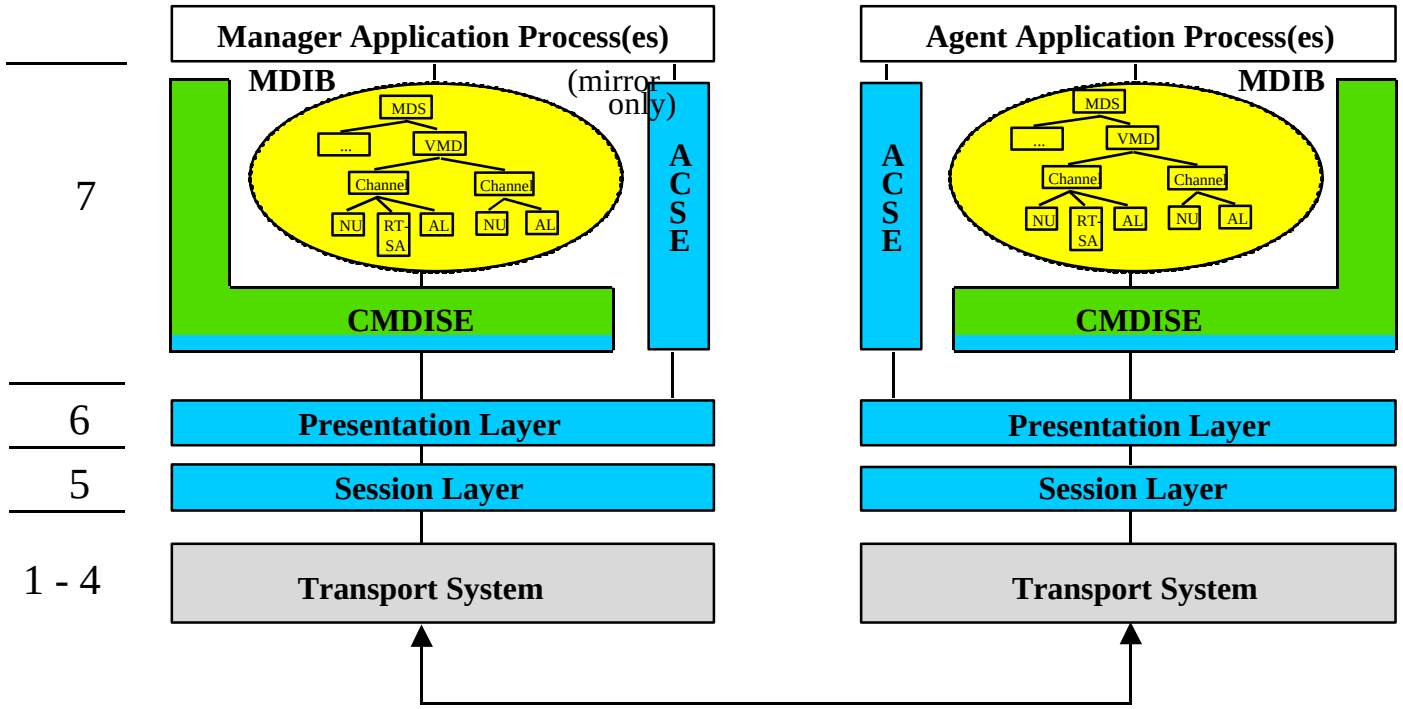
SIEMENS APPROACH

- With the advent of the 1073.3.2 “New” MIB standard, SIEMENS will:
  - Create a new version of the Protocol Converter which is compatible with the new 1073.3.2 standard.
  - Create a new host adapter which is also compatible.
  - Participate with vendors in prototyping the Ventilator implementation based on the new Lower Layer standard as well as the CEN/IEEE proposed upper layer standards.

SIEMENS' INVOLVEMENT

- SIEMENS participation in Medical Device Communication Standards Development includes:
  - IEEE MDCIG
  - IEEE 1073 Standardization Efforts
  - CEN TC251 WGIV and related Project Teams:
    - PT21 - "Vital Signs Information Representation"
    - PT35 - "Interoperability"
  - ISO TC215 WG2
  - Supporting Member for the AORTICS project

CEN TC251 PT35 - Interoperability Project Team



: PT5-021 Information Model + Definitions

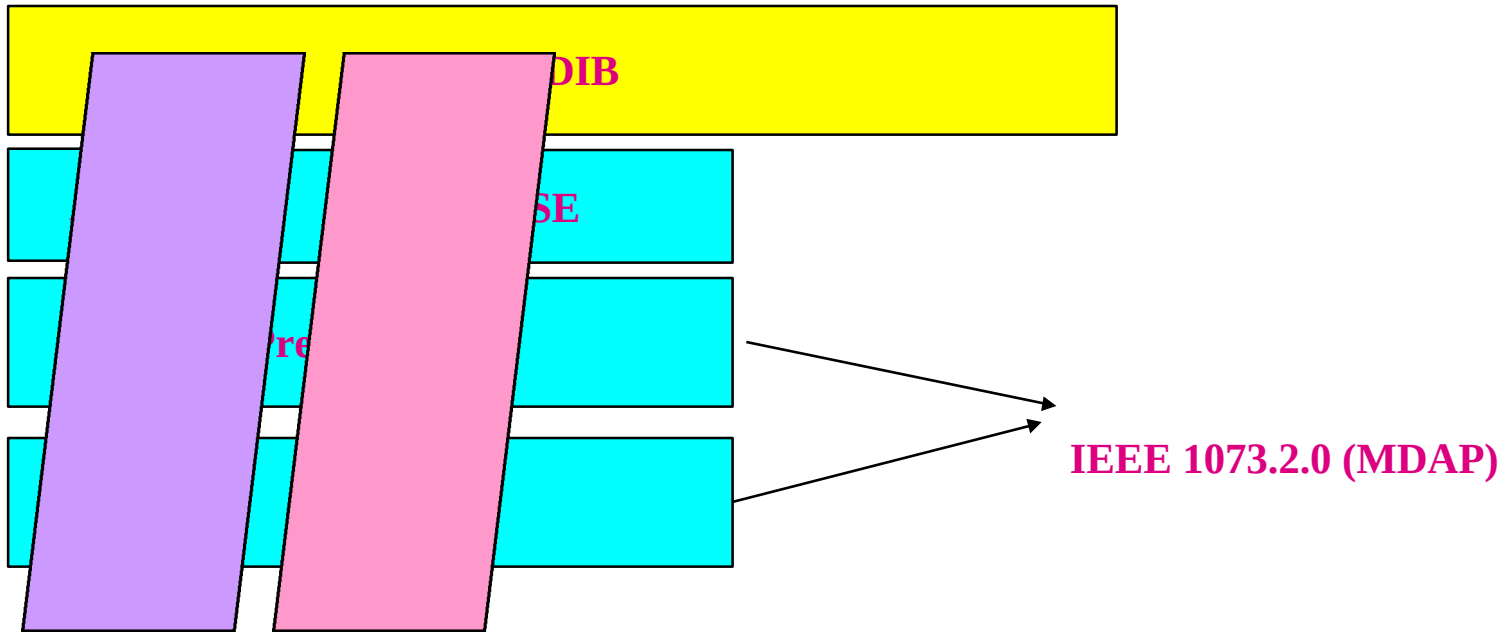
: WGIV PT035 INTERMED Work Items

: PT5-021 Service Model

: Transport System/ Lower Layers

From T. Norgall and M. Kraemer

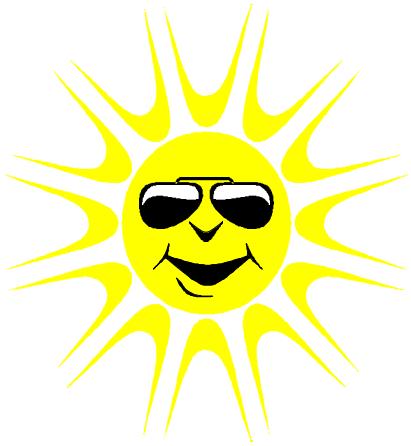
CEN TC251 PT35 - Profiles



- Open standards also leads to additional choices for the consumer as well as multiple sources for tools and support - for example the AORTICS project.

SO WE CAN GO FROM THIS…..

TO THIS .....



WE NEED YOUR HELP!

Specify IEEE 1073!