DATA REPLAY WITH ASAM CMP

TECHNICA ENGINEERING

*#ONE**STEP**AHEAD*

DATA REPLAY WITH ASAM CMP

AGENDA

#1 | WHERE WE ARE COMING FROM AND CMP 1.0

#2 | THE STEP FORWARD AND CMP 1.1

#3 | THE JUMP FORWARD AND CMP 1.1

#4 | CONCLUSION

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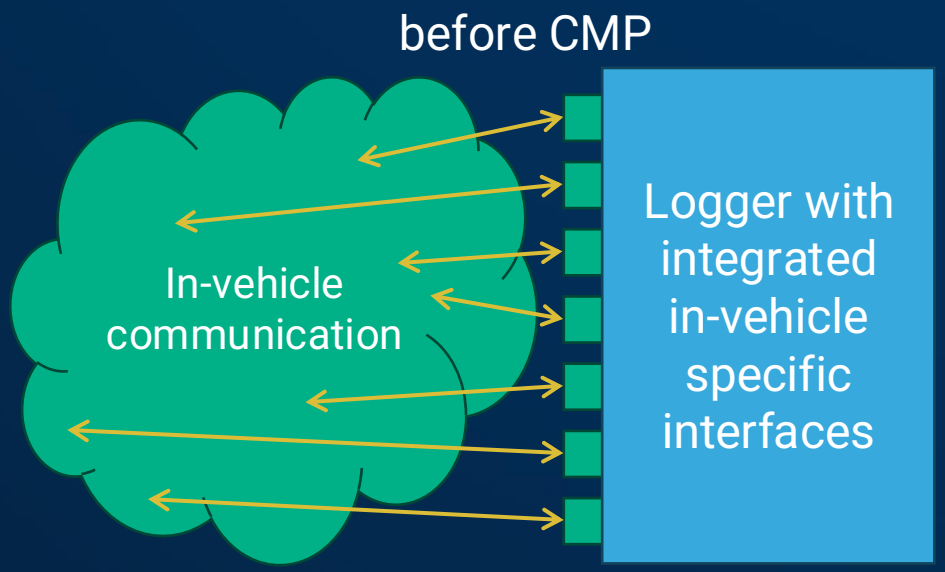
#1 | DATA REPLAY WITH ASAM CMP

WHERE WE ARE COMING FROM

WHERE WE ARE COMING FROM

BEFORE 2022

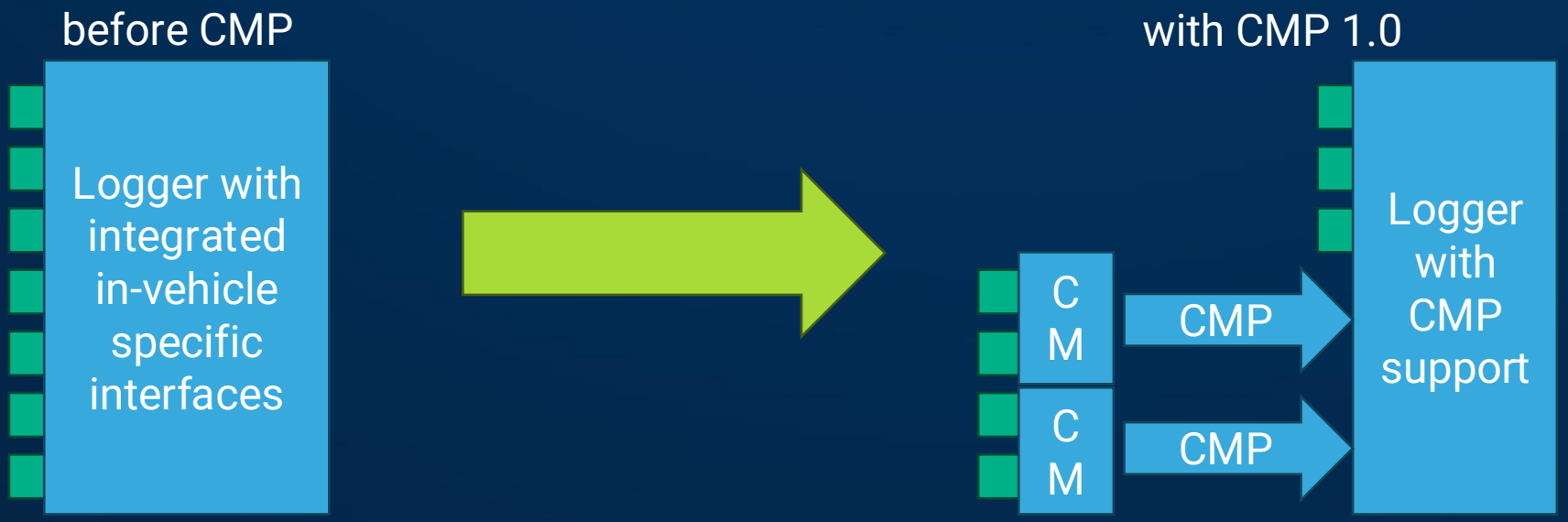


- In-vehicle Data acquisition of in-vehicle
  - Not very modular, complex loggers
    - Adding one more interface or new technology?
    - Signal integrity of distributed technology?
  - Not standardized – very vendor and OEM specific
    - Combine components of different vendors?
    - Features sets across vendors?
- Reuse of logging equipment over time?

WHERE WE ARE COMING FROM

SOLUTION: CMP 1.0

- In 2022 CMP 1.0 standardized modular data acquisition.
  - CMP uses regular Ethernet as measuring network.



Supported Technology:

- CAN / CAN-FD
- LIN
- FlexRay
- Digital signals
- UART / RS-232
- Analog signals
- Ethernet
- SPI
- I2C
- GigE Vision
- MIPI CSI-2 D-PHY
- Vendor-specific data

Capture Module (CM), Capture Module Protocol (CMP)

#2 | DATA REPLAY WITH ASAM CMP

THE STEP FORWARD

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THE STEP FORWARD

THE NEED FOR CMP 1.1

- New use cases were challenging CMP.
  - Using XCP in test vehicles requires to talk to ECUs.
    - This was not defined, vendor-specific solutions started to appear.

- Support for new technology was needed:
  - Raw Ethernet (for advanced TSN use cases)
  - 10BASE-T1S symbols
  - A2B data

- Other changes include
  - Better Timestamping definitions
  - PTPv2 support for connecting legacy tools

THE STEP FORWARD

CMP 1.1 OVERVIEW

- In 2026 CMP 1.1 add more technology and features.
  - Especially transmit support enables a lot of new use cases!

New Support:
- Raw Ethernet
- 10BASE-T1S Symbols
- A²B™

Capture Module (CM), Capture Module Protocol (CMP)

THE STEP FORWARD

CMP 1.1 OVERVIEW

No.	Time	Protocol	Length	Info
1	0.000000	ASAM-CMP	62	ASAM-CMP, Data Msg (Capturing) (CAN FD)
2	0.015310	ASAM-CMP	70	ASAM-CMP, Data Msg (Transmit) (CAN FD)

```
> Frame 2: Packet, 70 bytes on wire (560 bits), 70 bytes captured (560 bits) on interface unknown, id 0
> Ethernet II, Src: 20:00:00:00:4c:56 (20:00:00:00:4c:56), Dst: 03:01:01:01:01:01 (03:01:01:01:01:01)
v ASAM Capture Module Protocol, Device: 0x4711, Type: Transmit Data Message
  v ASAM CMP Header
      Version: 1
      Reserved: 0
      Device ID: 0x4711
      Message Type: Transmit Data Message (0x04)
      Stream ID: 0x00
      Stream Sequence Counter: 0
  v ASAM CMP Msg Header - Data Message
    > Timestamp: Jan  7, 2026 08:50:14.319117000 UTC
      Deadline: 1000000000ns
      Interface ID: 0x00000002
    > Transmission Options: 0x00000000
    > Common Flags: 0x00, Segmentation: Unsegmented
      Payload Type: CAN FD (0x02)
      Payload Length: 24
  v Payload - Data Message (CAN FD)
    > Flags: 0x0000
      Reserved: 0x0000
    > ID: 0x92345678, IDE, ID (29bit): 0x12345678 (305419896)
    > CRC SBC: 0x00000000, Reserved: 0x00 (0), SBC: 0x0 (0), CRC (17bit): 0x00000 (0)
      Error Position: 0x0000
      DLC: 0x08
      Data length: 8
    v Data (8 bytes)
        Data: 0001020304050607
        [Length: 8]
```

Wireshark Development Build based on master (Wireshark 4.7)

- CMP Transmit Use Cases
  - Logging with live control
    - Controlling debug information
    - XCP, DLT, and others
  - ECU test setups
    - Capture Modules connect ECUs
    - ECU Simulation / DUT Stimulation
    - Small desk setups to large HiLs
  - Data Replay Scenarios
    - Scalable logging and transmit
    - Data reprocessing is still a challenge

#3 | DATA REPLAY WITH ASAM CMP
THE JUMP FORWARD

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THE JUMP FORWARD

NEW SCENARIOS

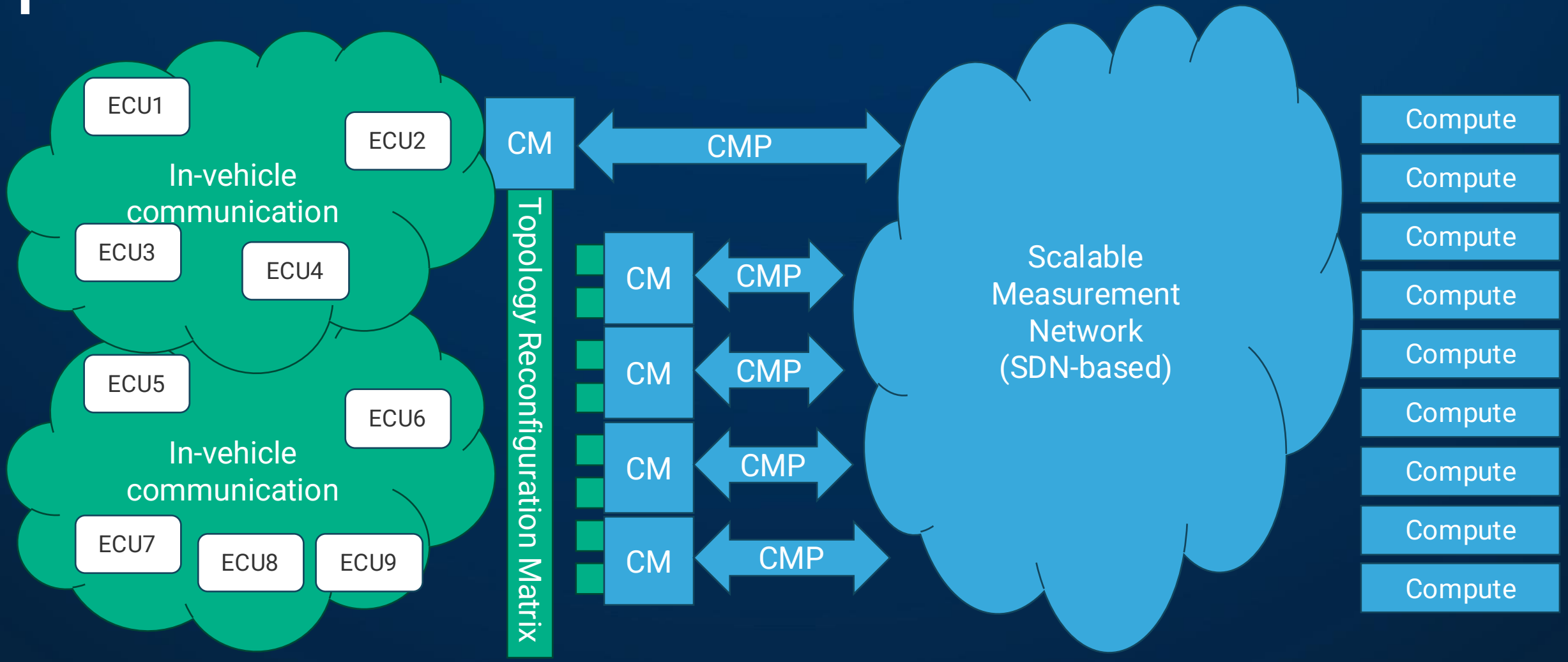
- CMP defines a scalable Ethernet-based measurement network
  - Multiple 10 Gbit/s can be recorded by Linux Servers in software today.
- CMP 1.1 allows to use the network bidirectionally

- One can even further scale HiL and testing setups:
  - Infrastructure decomposition.
  - Dynamic reconfiguration.
  - Scale up and out.
  - Mix and match multiple vendors.

- Enabling Elastic Testing Infrastructure.

THE JUMP FORWARD

ELASTIC INFRASTRUCTURE AND CMP 1.1



Capture Module (CM), Capture Module Protocol (CMP)

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CONCLUSION

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CONCLUSION

- CMP 1.0
  - Enabled modular vehicle data acquisition
  - Reusing equipment and allowing “mix and match”

- CMP 1.1
  - Adds support for more technology
  - Transmit standardized more interaction for in-vehicle logging
  - Supports more scenarios like HiLs
  - Is an enable to create elastic testing infrastructure

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