



# WG-RES

## Working Group Resources

A brief overview of activities and current status

WG-RES

October 2024

AUTOSAR



**BOSCH** Continental



STELLANTIS

**TOYOTA** VOLKSWAGEN GROUP

# WG-RES

## Workgroup Resources

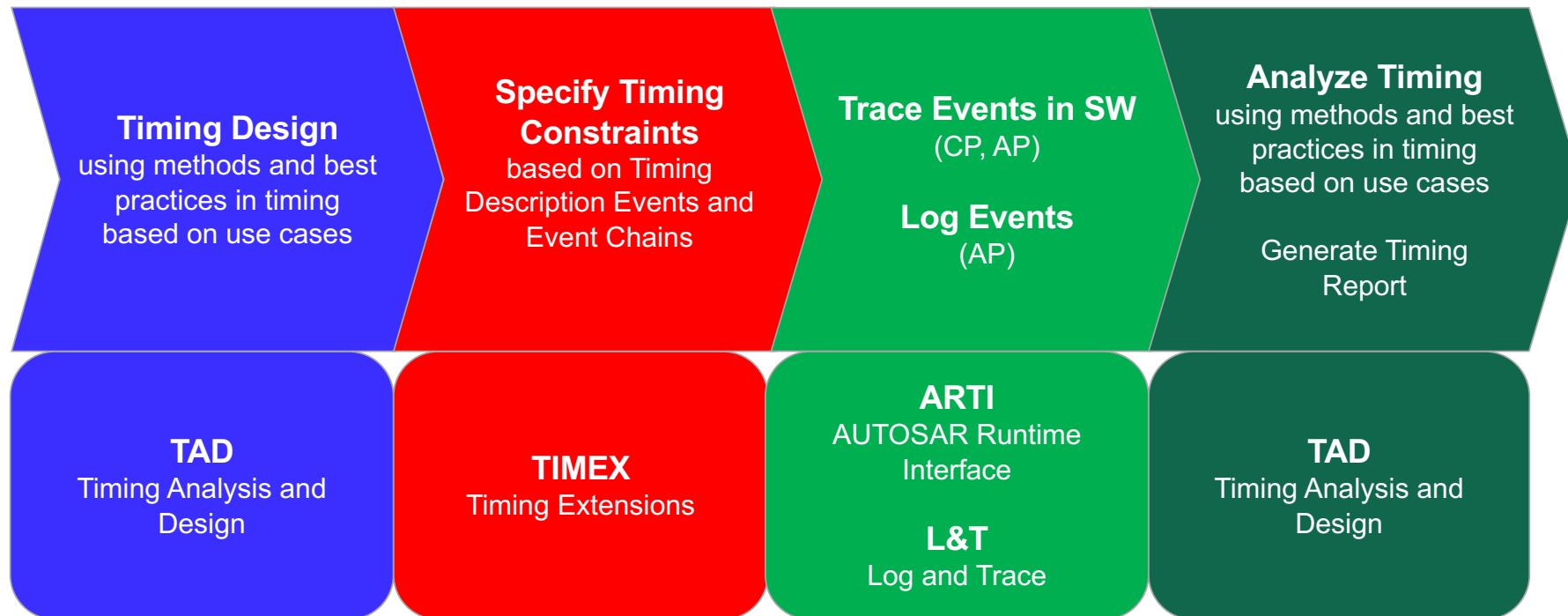
- ▶ Timing is a vital part of resource constraint systems
- ▶ That's why AUTOSAR shall cover timing design and analysis
- ▶ WG-RES is initiated by OEMs, Tier1s and all major tool vendors (debuggers, trace tools, timing analysis tools)
  - More feedback from OEMs and Tier1 is very appreciated for applicability
- ▶ The goal is to further integrate timing-oriented software and tools into the development cycle

# Our Vision

- The working group elaborates a **unified approach** for **timing analysis, design, validation and verification**, including the definition of suitable **tracing methods**, which can be applied to the **Classic and Adaptive Platform**. This covers to build up a **timing reference platform** and to specify the **timing description** to **different abstraction levels**.

# Timing in AUTOSAR

## AUTOSAR Timing and Tracing Approach

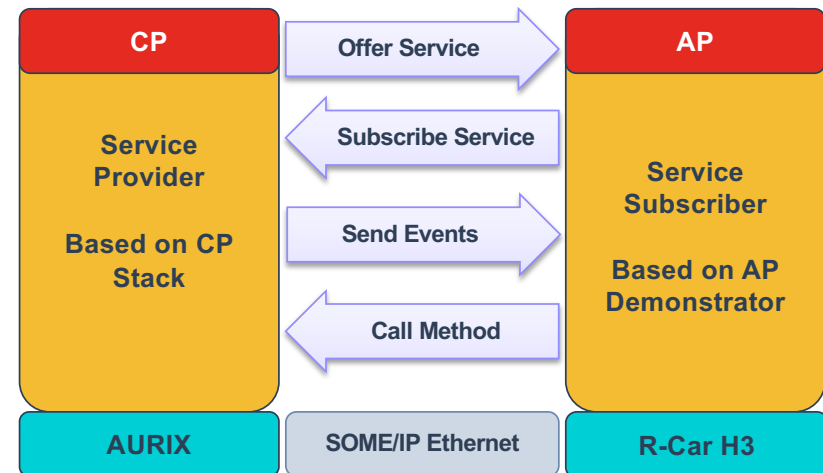


*Automated and tool-based process*

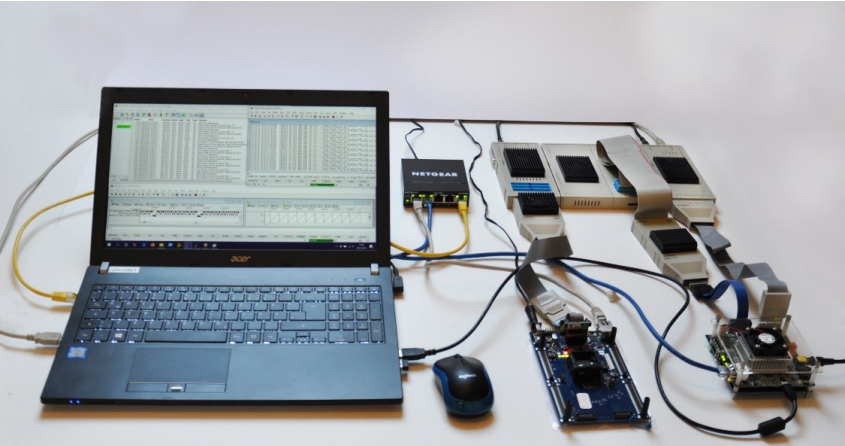
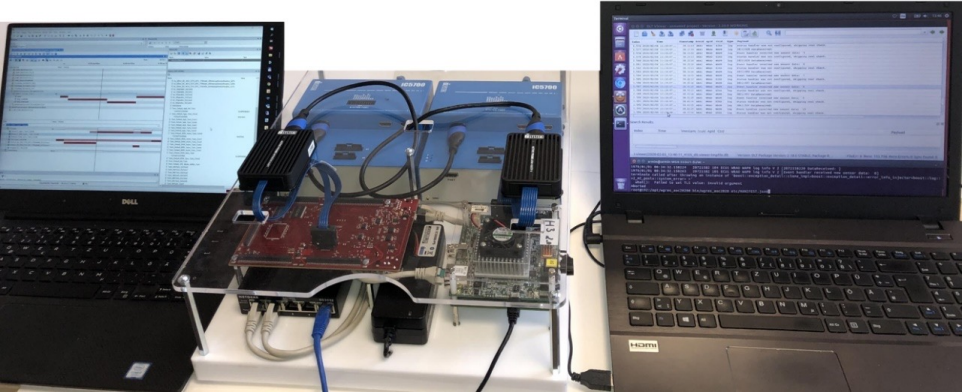
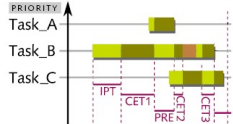
# Timing in AUTOSAR

## Timing Reference Platform (TRP)

- TRP is used to validate and demonstrate the timing related AUTOSAR specifications
- Consists of an adaptive platform (AP) and a classic platform (CP) part
- AP part is based on AUTOSAR AP Demonstrator
- CP part is based on full system description
- CP and AP use service-oriented communication

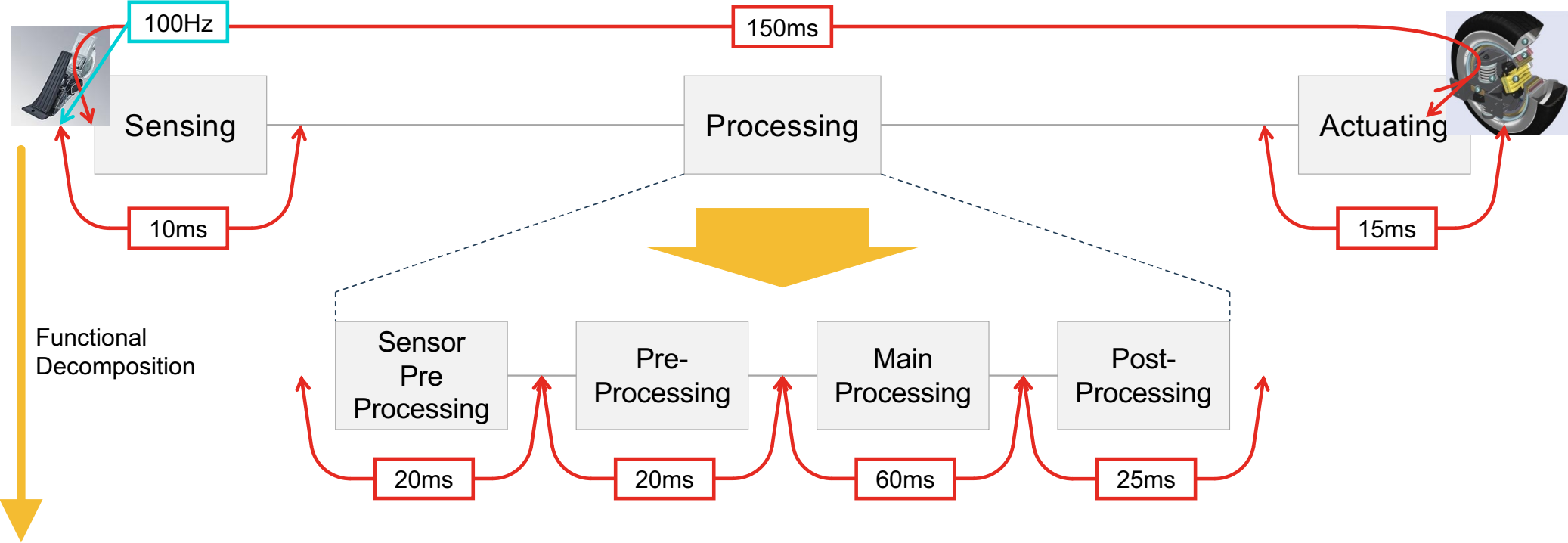


# Timing Reference Platform



# System and Timing Design

Example TRP: Partition a feature on functional level

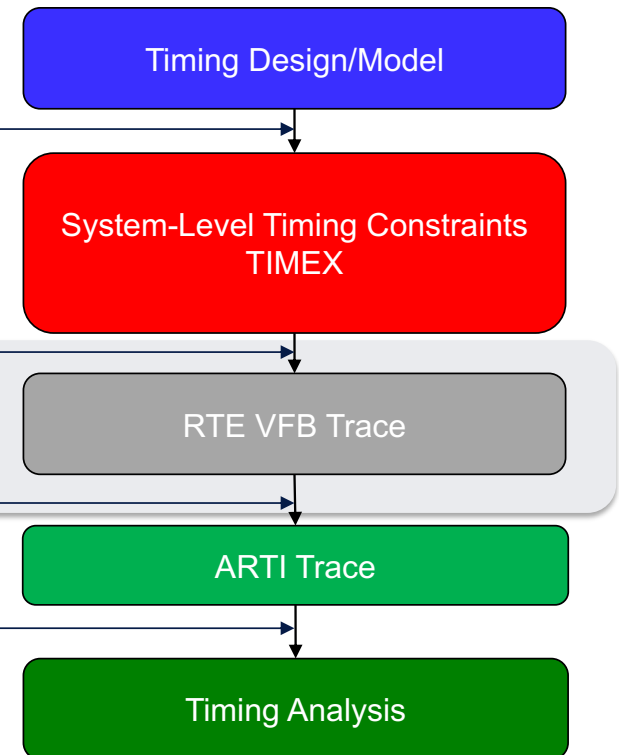


# Tracing Timing Events on Classic Platform

Methodology in TR\_TimingAnalysis

- Timing design/model is detailed in TIMEX events and constraints
- TIMEX events are mapped to RTE VFB trace event callouts
- VFB trace events are mapped to ARTI trace hooks for efficient recording
- Recorded ARTI trace feeds extensive timing analysis (ASAM ARTI specification)

CP



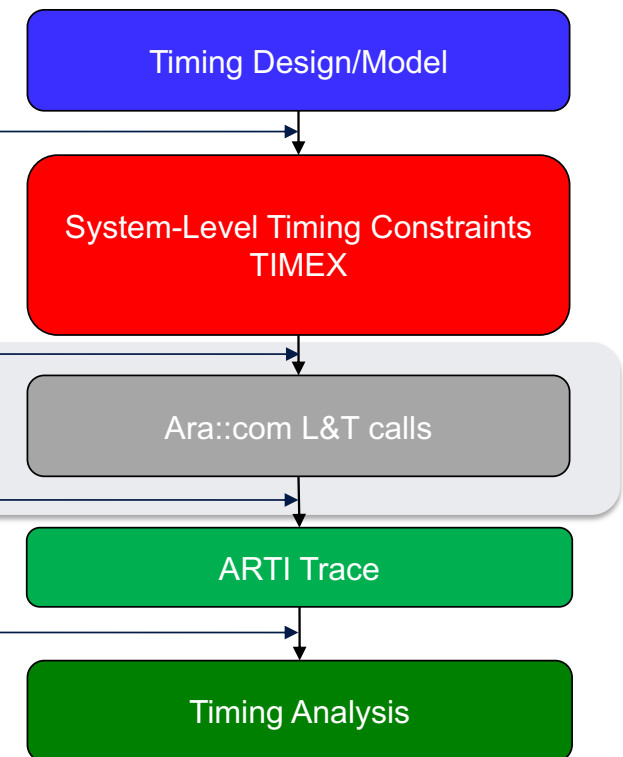


# Tracing Timing Events on Adaptive Platform

Methodology in TR\_TimingAnalysis

- Timing design/model is detailed in TIMEX events and constraints
- TIMEX events are mapped to L&T messages and L&T calls are implemented in ara::com
- L&T calls are routed to ARTI trace for efficient recording
- Recorded ARTI trace feeds extensive timing analysis

AP



# AUTOSAR Specification for Timing

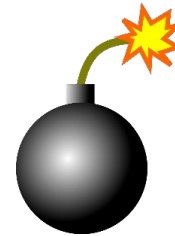
- What does AUTOSAR provide?
  - Standardized timing design (both, system level and platform level)
  - Specify timing constraints in TIMEX (both CP and AP)
- Classic Platform:
  - Trace operating system (OS) with ARTI
  - Trace runtime environment (RTE) with VFB Trace and ARTI
- Adaptive Platform:
  - Trace operating system (OS) with ARTI
  - Trace applications and functional clusters with ara::log
  - User based event logging with ara::log

# Conclusion and Outlook

- We deliver everything, what good timing (design & analysis) needs.
  - The methodology and process is defined in AUTOSAR
  - But
    - We need feedback from real world applications.
    - We need volunteers to improve the standard.
- What's next?
  - We want to extend the Timing Reference Platform (TRP) to implement the complete methodology as a validation and as a blueprint for other timing projects.

# Renaming of WG-RES

- ▶ Nobody understood resources
- ▶ In the group we focus on **timing and tracing**
- ▶ New name: WG-TNT (Timing and Tracing)
- ▶ Will take place after R24-11





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Thank You!



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