AVL PRODUCT DESCRIPTION

AVL CRETA 6™ R4

TRUST YOUR CALIBRATION POWER

A high amount of control unit parameters, lots of vehicle variants and globally distributed teams for calibration work are a common phenomenon within today's vehicle calibration projects. A major challenge of the complexity is the handling of many different control units ranging from ADAS/AD, Chassis, BEV towards Powertrain. This includes the well-structured storage of the great number of parameters produced by various teams at different locations, the traceable documentation of changes and the conflict-free compilation of all single parameters to intermediate and final results without any inconsistencies. Robust final results are important to avoid cost-intensive and brand damaging vehicle re-calls!

AVL CRETA 6™ enables the most sophisticated methods and efficient handling of calibration data, thus increases the quality of results, while reducing data management costs by up to 50 percent.

YOUR BENEFITS AT A GLANCE

- Traceable, secure and simple administration and documentation of control unit data
- Worldwide collaboration between all team members
- Quick overview of all data streams based on simple dashboards for the users
- Plausibility check of datasets using outlier detection methods
- Calibration Data comparison, viewing, editing and checking

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DATE: 26.09.24

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Introduction to AVL CRETA Generation 6

The new Generation AVL CRETA 6 is available in 2 editions:
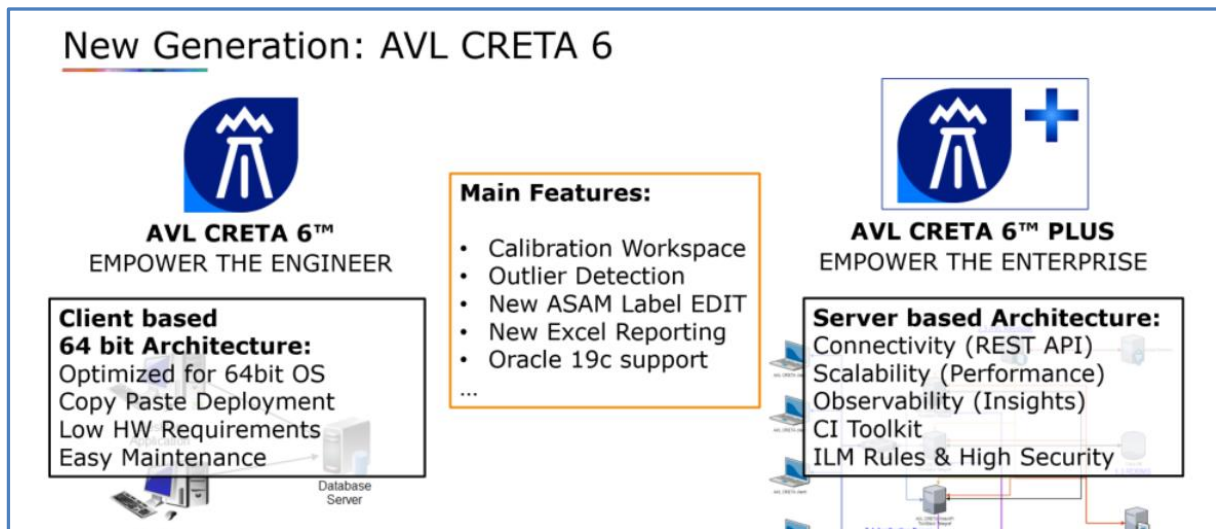
1. AVL CRETA 6™

2. AVL CRETA 6™ PLUS

AVL CRETA 6™ is based on a 2 Tier system architecture, which has been optimized for even more simple commissioning, installation and roll-out. It combines the advantages of low IT and infrastructure requirements, but still delivers a significant added value to the customer by a big list of new features and functionalities.

AVL CRETA 6™ PLUS is the premium edition based on a modern "Multi-Tier" system architecture which offers a complete different experience for all affected stakeholders of a whole enterprise. It includes all features and benefits which are listed for CRETA 6™.
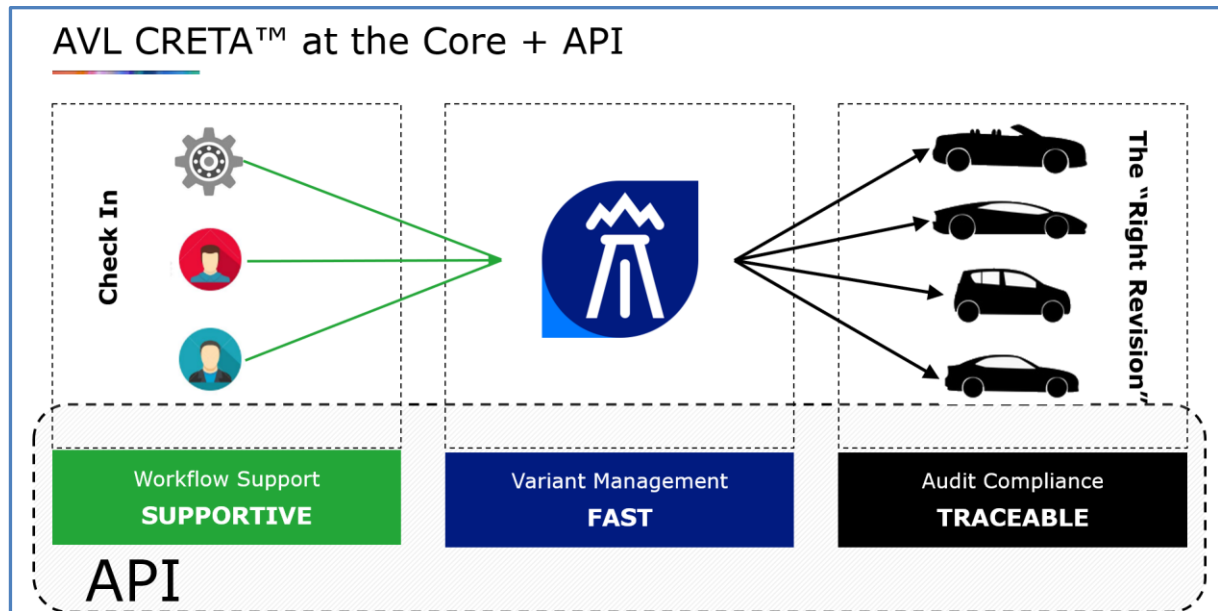Moreover the extended architecture of CRETA PLUS offers the following additional advantages:
- Flexible Connectivity
- Scalability
- Automation
- CI/CD Integration
- High Security

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AVL CRETA Overview

AVL CRETA's core is "Variant Management" of calibration projects. CRETA supports variant management with many features throughout the system starting from comparisons, rules, attributes and attachments.

The calibration engineers need a system which supports them in "Check-In" of their data, so they don't get lost in the complex structures. Thus AVL CRETA 6™ is optimized to be as easy to use as possible for the calibration community.

To make the picture complete CRETA is a system which needs to fulfil governmental and international standards for safety, security and traceability. Our customers trust our system to make sure the right dataset ends up in the right vehicle at the end of the day. CRETA is certified according to ISO26262 for all "ASIL" levels.

As different customers deal with different amounts of complexity and amounts of data, the customer can choose between 2 editions. For those who need more performance, integrability and higher security, CRETA 6 PLUS is the right choice.

To integrate AVL CRETA in Software Build Pipelines or exchange data with any other internal system, AVL CRETA offers modern API's. These API's are available within the AVL CRETA 6 PLUS edition.

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SCOPE of AVL CRETA 6™ R4

1. Workflow support

AVL CRETA 6™ is a calibration process oriented software tool. By using AVL CRETA 6™, the customer can implement a unified method for the management of calibration projects. Nevertheless AVL CRETA includes a very stable set on pre-defined process and project templates, which make it simple for the customer to start to use it.

Process example:

Engineers work on their calibration tasks in different application areas, for example in simulation environments or on the road. On a regular basis (i.e. daily) engineers deliver and document their calibration results in order to ensure traceability. The calibration manager collects and integrates the engineers' results into a new dataset. Calibration engineers receive the new dataset releases and continue with their work on the next calibration task.

AVL CRETA Process Example:
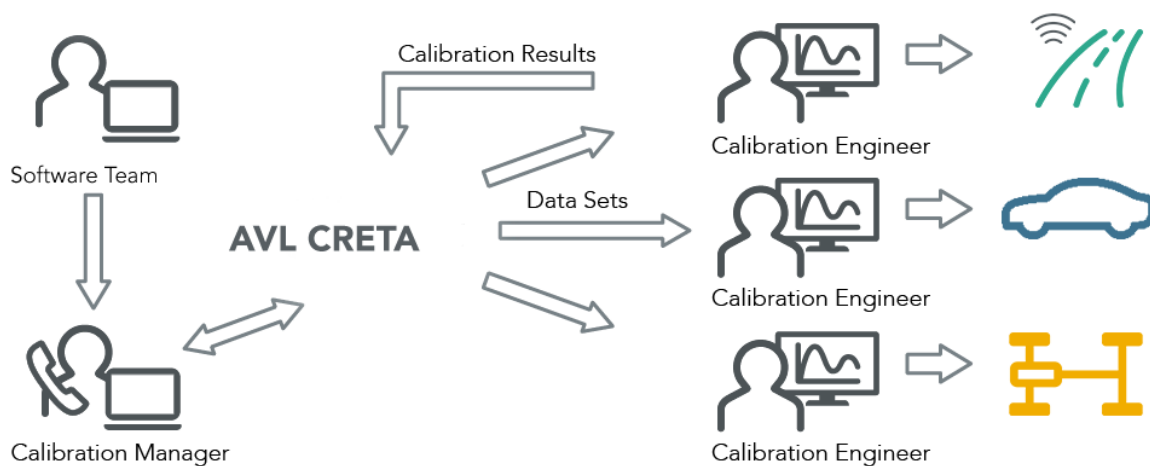
The customer is not required to change his calibration process – AVL CRETA 6™ is customizable, i.e. can be adapted to match the tasks of different project teams and their working style.
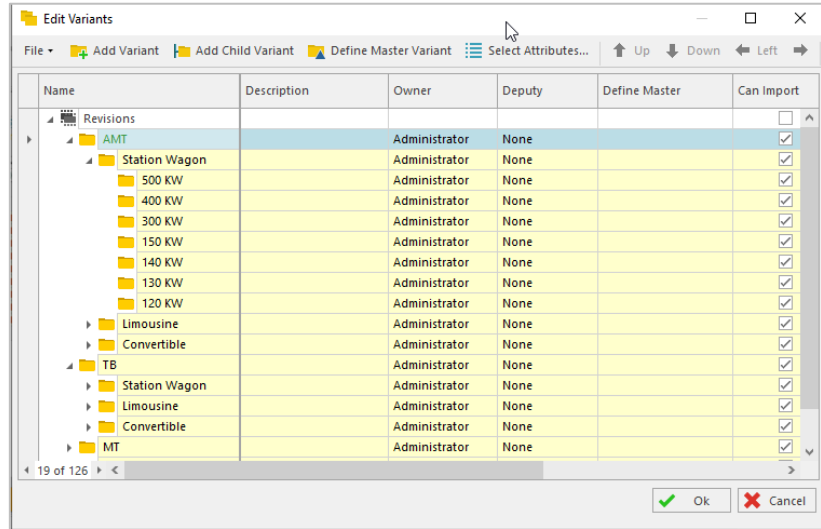
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2. Variant Management

AVL CRETA offers simple methods on creating and managing calibration variants. This starts with wizards, imports and definition of supporting attributes which help to create complex variant structures within your calibration project.

Filters help the users to easily find their variants they are responsible for or have to deal with. Project pilots can preconfigure filters for the calibration engineers in order to make sure, calibration deliveries happen into the correct variants.

Often data is not only delivered by external sources, but also needs to be edited directly in AVL CRETA to solve inconsistencies or set correct switches before it is even possible to go to a vehicle test.

Comparing, editing, viewing and checking of multiple calibration variants is done using the AVL CRETA Compare & Edit functionality.
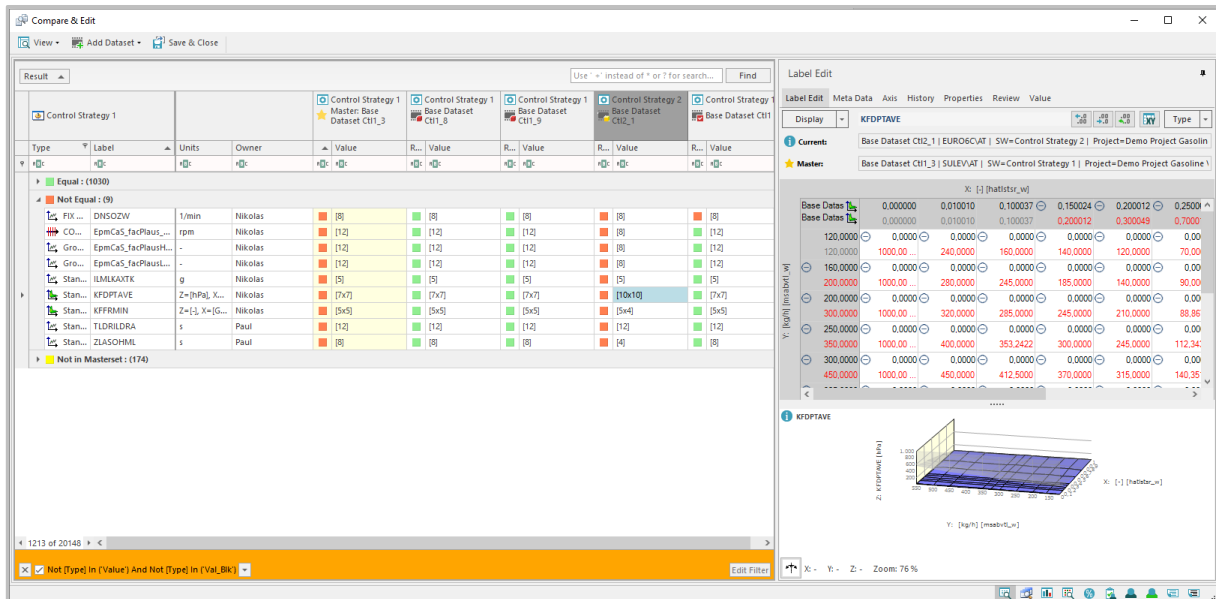
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3. Traceability & Compliance

By using AVL CRETA 6™, the responsibility for each single calibration parameter is clearly defined and linked to one responsible calibration engineer. AVL CRETA 6™ also supports user permissions for internal customers and external suppliers.

The clearly defined responsibilities enable a conflict-free compilation of intermediate calibration data sets to a new result.

Typical data conflicts due to merging data from several sources can be avoided by checking the responsibilities for each calibration item (label) in advance. Nevertheless, if conflicts arise, corresponding labels will be marked for further processing.

If conflicts occur, the corresponding calibration engineers are automatically informed via the AVL CRETA 6™ notification system which can be even linked to the users email system.

Every change in AVL CRETA is fully traceable, thus it greatly supports the engineers to detect sources of inconsistency even if they trace very far back in the project.

AVL CRETA supports Block Chain technologies to make sure data inside the system has not been manipulated at any time. Therefore snapshots can be created during the calibration project which are fixed and unchangeable.

AVL CRETA 6 allows to define Calibration Review Policies. Defined Calibration parameters which are under very strict control, can be defined of being review relevant. In case calibration parameters are changed which are "Review relevant" the system automatically triggers a review process where defined roles within an organization need to sign of that particular change.
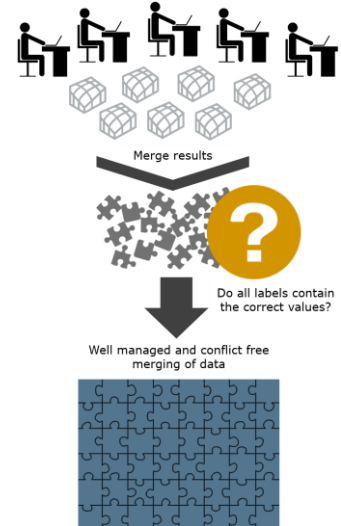
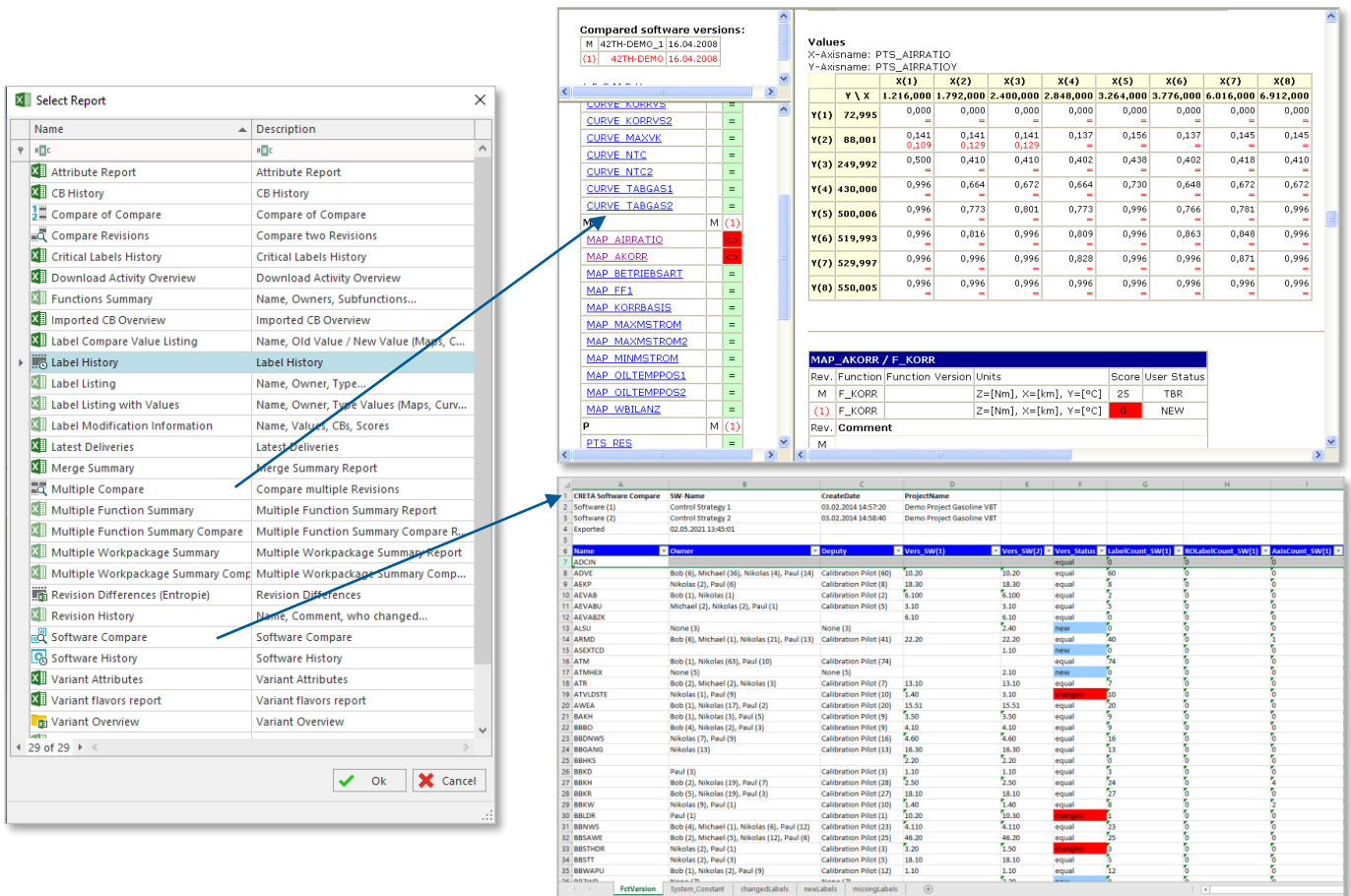**Calibration Review Process Example:**
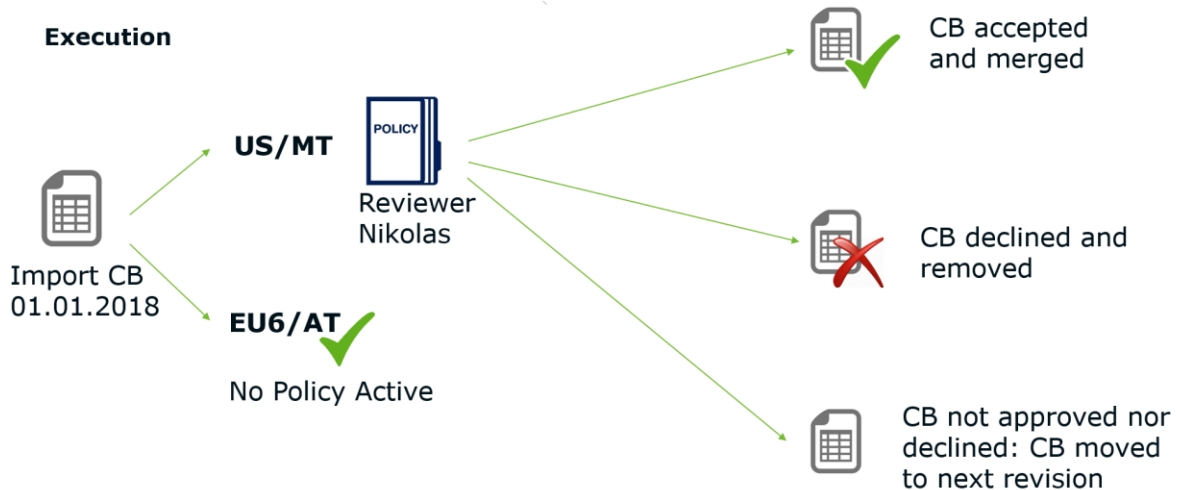
4. Reporting

Reports, showing the entire history of calibration and software changes, can be created anytime during a calibration project

Calibration Engineers like to use Excel for many reasons when reports have to be post-processed. There is a well-established set on pre-defined reports available to analyze and discuss changes over a range of calibration steps during the whole development phase. Additionally, software history reports can be created easily. This kind of report provides a comparison of all functions of different software versions over a range of software changes.

Report examples:

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5. User experience

AVL CRETA 6™ is highly intuitive and easy-to-use. Based on the feedback of thousands of users AVL has improved the user interface of AVL CRETA 6™ especially in terms of the application orientation and a workflow assisted calibration data management. The user interface allows a simple and clearly configured operation with only the relevant elements being displayed, depending on the different tasks of either an engineer or manager. All data operations such as for example the integration of results into new datasets are workflow oriented and user-guided.
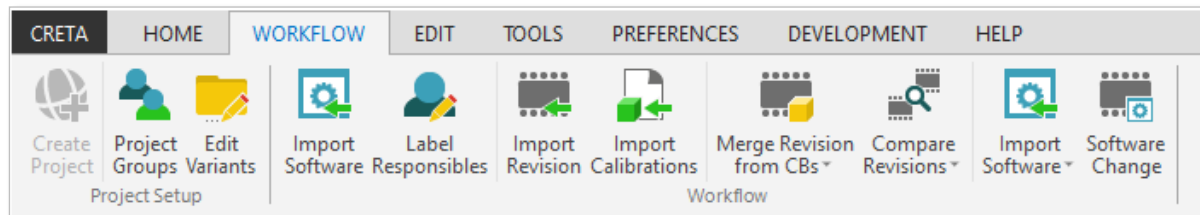
AVL CRETA 6™: Process- guided operation

The project and variants structure is displayed as "tree view" within the AVL CRETA 6™ explorer. In addition, several features are available to provide an overview of the projects while enabling users to focus on their current tasks:

- Configurable graphical display to highlight project elements, i.e. released software
- Filter functions to minimize the number of displayed elements
- Quick search and extended search functions for an advanced search
- Favorites for saving project paths which are used repeatedly
- Shortcuts for saving selectable project nodes i.e. as link on the desktop
- History function for easy access to projects based on the last navigation steps
- Different display modes of the project tree i.e. structured according to data sets

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6. Notification System

For new ASAP2 files or new revisions as well as inconsistent data or so-called sensitive parameters, AVL CRETA 6™ automatically informs the user by the integrated AVL CRETA 6™ Notification system. Thus, calibration engineers will be informed in-time about relevant information on the calibration project.

Application examples:

- Notification if sensible labels have been changed
- Notification in case of changes of axes used by several labels (common or group axis)
- Notification, if somebody with sufficient permissions is changing labels during the absence of the responsible engineer, i.e. in case of vacation
- Notification if projects are checked out for test trips
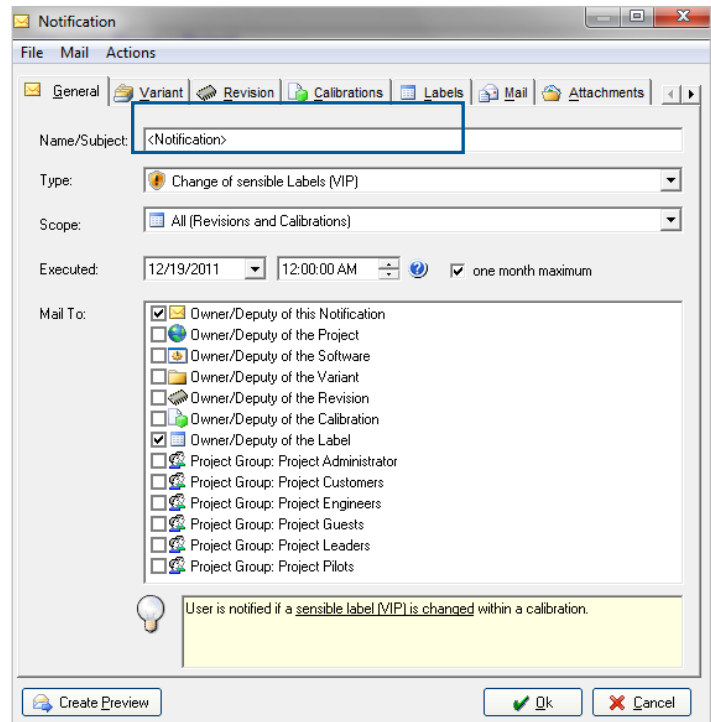- Notification if configured limits have been exceeded

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7. Outlier Detector

The AVL CRETA 6™ Outlier Detector replaces the AVL CRETA Compare Pro. It provides a powerful possibility for analyzing, validating and detecting outliers from a big number of Calibration Datasets based on defined characteristics and attributes and patterns.

Using an interactive Step by step approach this option helps you to identify outliers in your datasets by having the possibility to compare, analyze and define clusters for variants and attributes within your calibration project. Using easy to understand coloring the user can quickly understand patterns and identify possible areas for improvement in commonality of the calibration. Using this insight, the user is able to define patterns or exclude labels from the analysis. In the last step the AVL Outlier Detector is able to automatically detect errors or outliers in a still very early stage, before delivery into production.

Your advantages at a glance:

- Instant comparison of a big amount of calibration datasets (~100 Datasets)
- Finding of calibration inconsistencies
- Validating final deliveries in a very simple way
- Understanding of calibration patters for future use
- Automatic proofing of patterns and consistency
- Simple filtering and creating of Reports

8. Additional CRETA 6 Features

- Engineer Dashboard
- User-definable attributes, such as customer name, engine number, market, etc.
- Import/ export for control unit parameters and related meta-data, i.e. comments, status, score, responsible users as well as label-files, attributes, etc.
- Working with synchronized calibrations
- Statistical summary
- Archive of old projects
- FTP Server to store large attachments
- And many more features

Compatibility:

AVL CRETA 6™ is the ideal solution for the management of calibration data that is structurally based on ASAM standards. Supported formats for importing and exporting of calibration parameters or control unit software are: CSV, DCM, PaCo, PAR, BIT, HEX, S-Records (S19, S3, S24…), SET, MOT, A2L, SOB, H32, VST, etc.

Scope of supply:

- AVL CRETA 6™ software
- License file to activate the software
- Documentation
- Training
- Installation
- Software care & support contract

Additional support on request:

- Definition of attributes for the server software and user groups
- Roll-out and applications support
- Integration and/or interfaces to existing IT environments

Please, ask for your personal AVL CRETA 6™ demo software: CRETA.Support@avl.com

Please contact CRETA.Support@avl.com or ask one of our technical offices for further details.

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Scope of CRETA 6™ R4 PLUS

AVL CRETA 6 PLUS System Architecture:
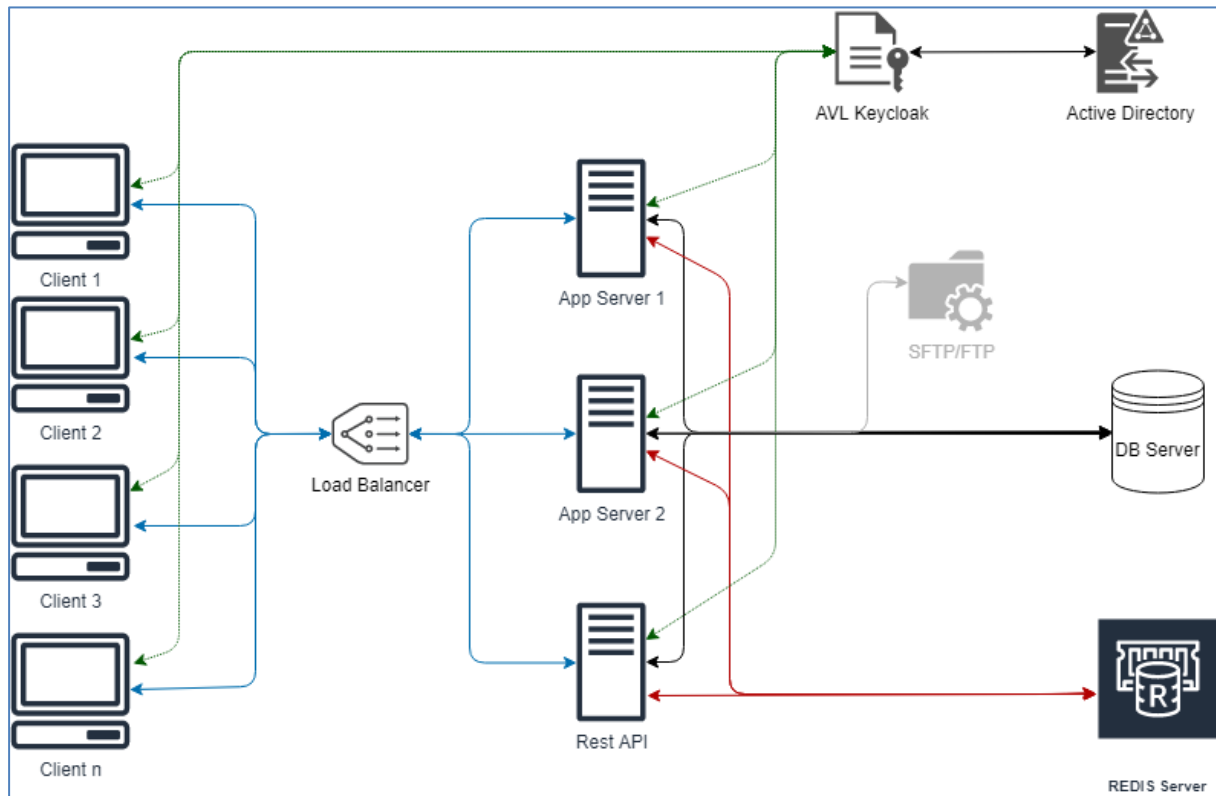
The AVL CRETA 6 PLUS System Architecture consists of:
- The CRETA Client
- Database Server (Oracle, MS-SQL or PostgreSQL)
- Load Balancer
- 2...n Application Servers (Microsoft IIS)
- AVL Keycloak (Identity and Access Management)
- REDIS Service (In-memory cache)
- AVL CRETA Rest API Server

AVL supports the customer in setting up this state of the art infrastructure.
See AVL CRETA Installation Requirements for Prerequisites.

AVL CRETA 6 PLUS contains all features and functionalities of AVL CRETA 6.
Despite the modern and state of the art architecture, AVL CRETA 6 PLUS offers the following features:

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1. Connectivity – REST API

Connectivity is the key to efficiency and robust processes. The new REST API of AVL CRETA 6™ PLUS offers modern, secure and robust interfaces for simple connection in a modern enterprise environment. It offers a programming language agnostic interface to connect to any inhouse system at our customers.
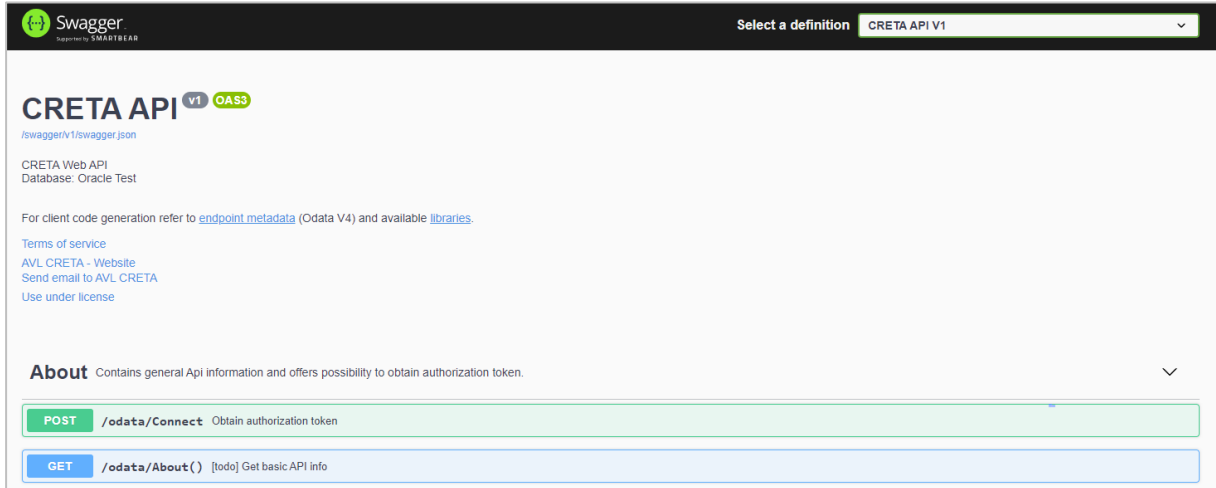
The Rest API comes with a SWAGGER definition, which allows to test the controller and methods before the final integration code is written. It helps to interface developer to understand the resulting output files in a JSON format, before the work has even started.

The REST API enable the customer to build tools and applications around the base CRETA environment in order to increase productivity and create stable processes.

Example of a small project status dashboard build with the CRETA REST API:
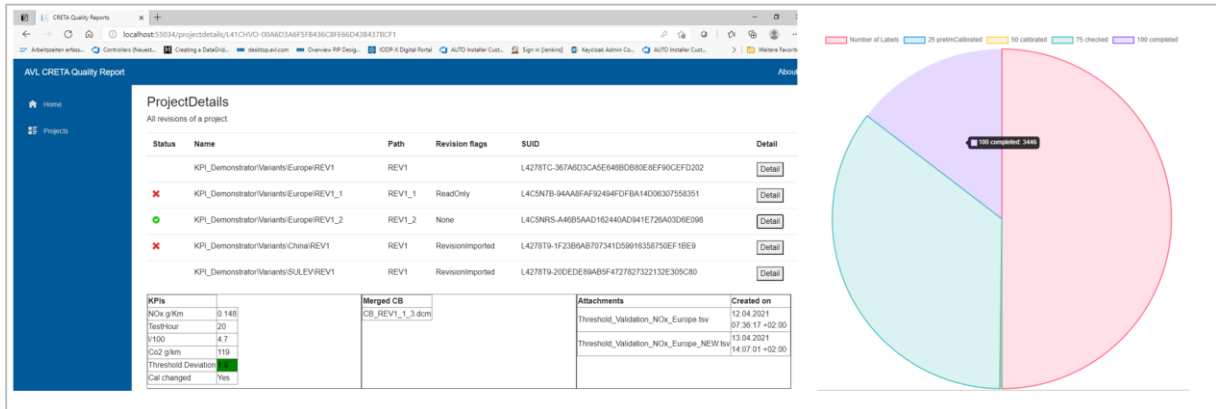
Note: AVL CRETA 6 PLUS contains a license for 4 CPU Cores on the REST API Server. If the customer wishes to use more CPU Cores, additional licenses for more CPU Cores need to be purchased.

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2. Scalability

Data amounts are constantly increasing due to many different factors which combined lead to very haihg factors of data increase. Looking at our larger customers we see that typically the amount of data is increased by at least a factor of 3 per year.
To cope with this situation AVL CRETA 6 PLUS is designed to handle time consuming and performance critical task in a saleable way. This means the customer has the possibility to speed up via investing in more backend infrastructure.

AVL CRETA 6R4 PLUS offers the following saleable features:

- Scalable Calibration Import

AVL CRETA 6 PLUS enables the possibility to scale the calibration import, thus the main work is performed on the application server environment. This greatly simplifies and improves the work of calibration engineers which may be working from remote locations. The engineer get's a very clear and simple overview of data which has been submitted. In combination with the Engineers Dashboard the productivity has been significantly improved.
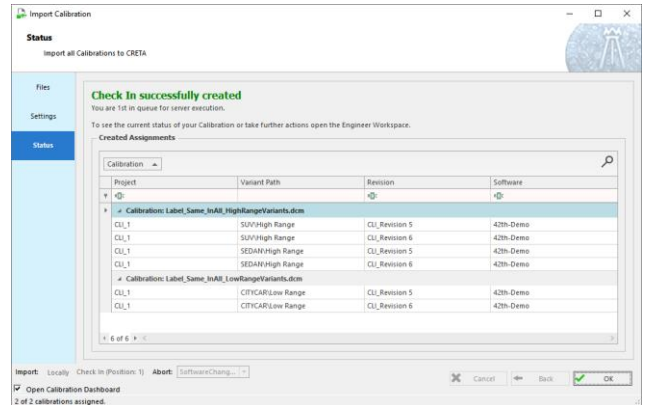
- Scalable Sync CB

AVL CRETA 6 PLUS enables the possibility to quickly update and edit Calibrations within the CRETA GUI. The transfer of this changes to sometimes even more than 500 CB's was optimized to run on the application server and hugely improved performance. Customer who use big variant structures benefit a lot from this improvement
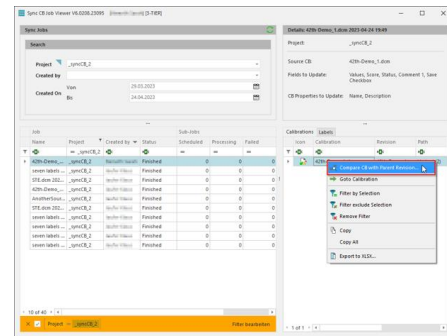
- Parallel Dataset Merge

AVL CRETA 6 PLUS enables one of the most important and often used task "calibration merge" to be run on multiple cores within one single merge operation.
This increases the performance significantly. To have the full control over the multiple running processes and actions, CRETA offers a simple overview of the status of the calibration merge.

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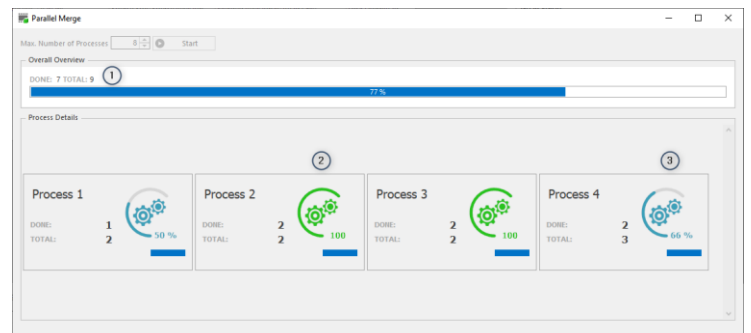
3. Automation Toolkit

For integration of AVL CRETA into the customers CI/CD pipeline, we offer the AVL CRETA Automation-Toolkit.
It enables the automation of AVL CRETA with tools like e.g.: Jenkins, to be able to process new Control Software directly after release by the calibration teams.
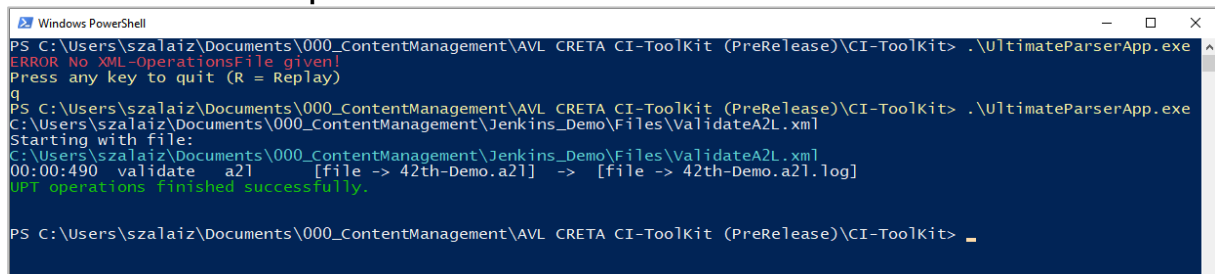Many processes in an CI/CD Pipeline are automated thus often also require cyclic operations of task which do not generate data which needs to be stored in a traceable system.

Additionally to our API's the data pre- and post-processing is performed in an automated way using the Automation-Toolkit.

Automation-Toolkit example:

The Automation-Toolkit can be automated using automated command line inputs. Thus many operations can be performed without a GUI.
The following tasks can be executed:
- Validate A2L file
- Validate A2L and HEX file
- Import HEX and export as calibration like DCM
- Import calibration file like DCM and export as CDFx
- Compare HEX files
- Compare calibration files
- SW Change with HEX files
- SW Change with CB files
- Convert to Json

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4. ILM & Security

AVL CRETA 6 PLUS offers all needed methods to implement your enterprise "Information Lifecycle Policy". Define how your most critical information artefacts should be stored, archived or deleted automatically.

Additionally, our customers need to be able to protect their data according to highest IT Security standards. AVL CRETA 6™ PLUS offers "Identity Management" with authentication and authorization on the highest technical level in order to fulfill the complete scope of the ISO27001, TISAX and GDPR demands.

AVL CRETA Identity Management:
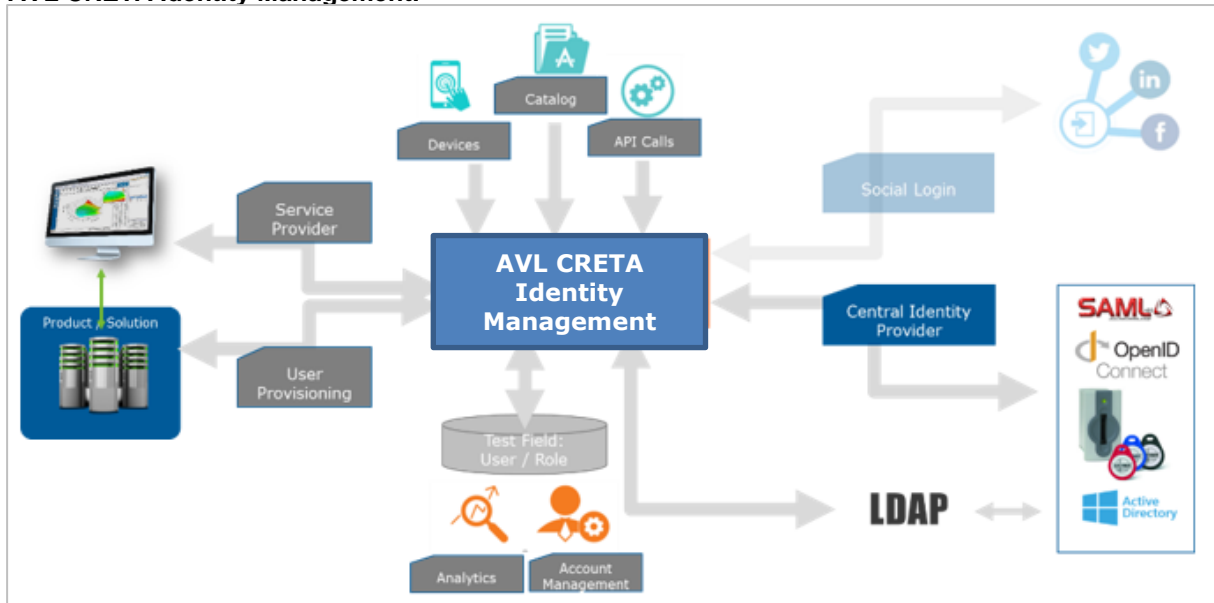
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5. CRETA Offline

AVL CRETA 6 PLUS offers the possibility to work efficiently with calibration data even if your are not connected to a network or you are on the road with a test vehicle. This supports the engineers to have access to all needed datasets always when needed to switch to a different variant which was not prepared upfront in the calibration tool.

AVL CRETA 6 PLUS allows to subscribe Projects and Variants which are then automatically synced into AVL CRETA's Offline Client which enables viewing and comparing of datasets and exchange files which are created during daily work.

When access to the network is re-established it is possible to re-sync the data to always have the newest datasets from subscribed variants with you.

AVL CRETA 6+ Offline:
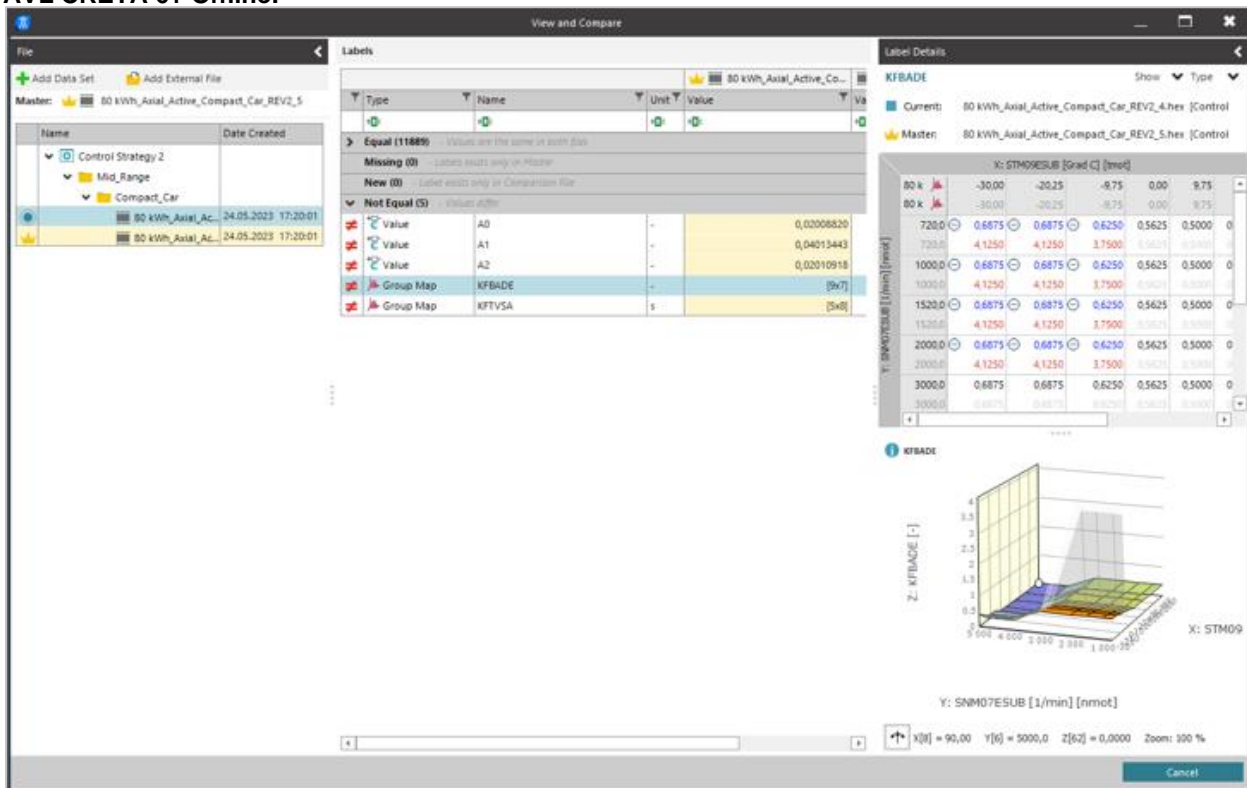
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6. Release Bundles

AVL CRETA 6™ PLUS offers the possibility to use a new area in AVL CRETA to manage and organize bundles of SW releases for your vehicles. This enables a complete new level of organizing data for calibration engineers on the road and in various testing environments, as they get all datasets for their unit under test in one step.

Release Bundles enable the user to create vehicle projects which typically consist of all available vehicle variants. Each vehicle variant consists of a defined set of xCU's e.g.: BMS, Inverter, Motor controls. The release bundle is linked to the corresponding working "Project" in AVL CRETA to derive the most actual dataset of the particular control unit. This greatly simplifies the life of a calibration engineer who in the past had to search for all corresponding datasets before being able to start the work on a vehicle.

Your advantages at a glance:

- Instant download of all corresponding datasets of one vehicle
- Information on all available xCU's of the vehicle
- Time saving for the identification and data gathering
- Simple "CRETA like" building of digital dataset twins
- Automatic update of variants based on the progress in the xCU projects
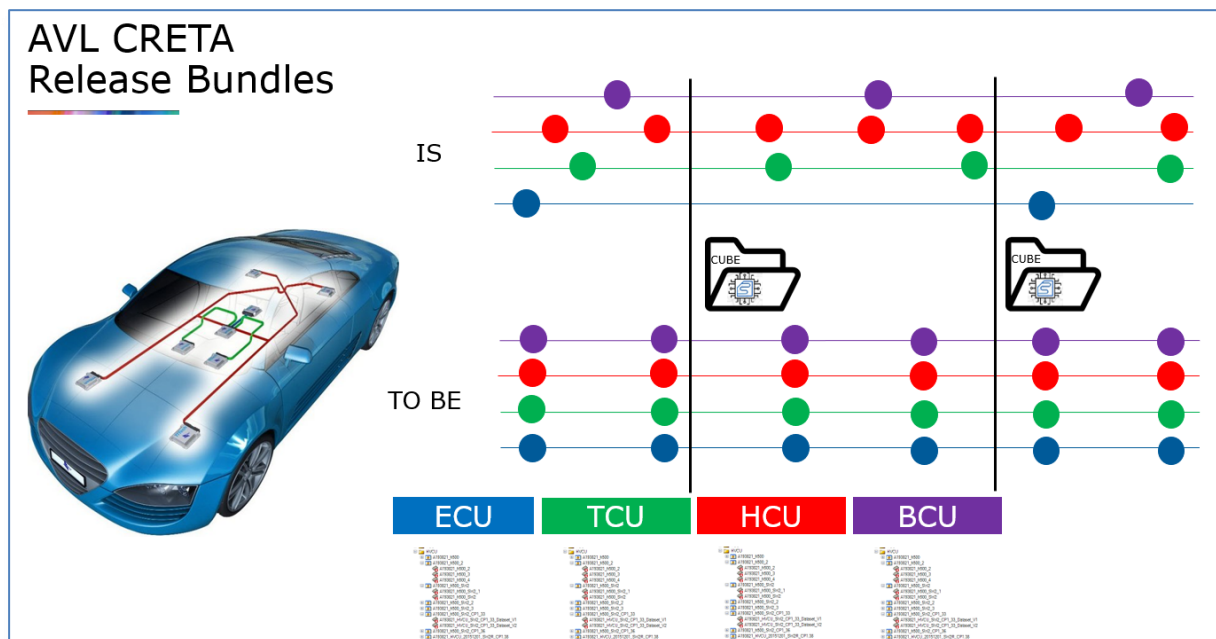- Release Bundles are always up to date with minimum effort

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Product Options

1. Optional: AVL CRETA 6™ Component Library

The AVL CRETA 6™ Component library can be used to centrally store and manage project-independent parts of control unit data sets, as for example the linearization of temperature sensors. These data sets are automatically referenced to the calibration projects and can also be used for pre- calibration.

The AVL CRETA 6™ Component library facilitates the updating of component data in projects and minimizes maintenance costs for component data. The central management of the continuously up-to-date component data also facilitates the initial parameterization of new projects.
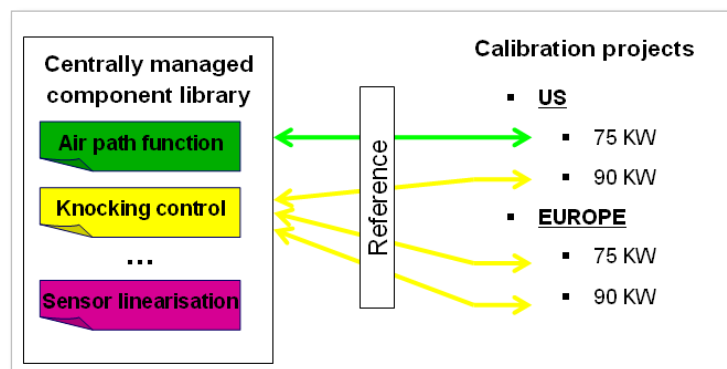
Application examples:

- Easy and project-overlapping function calibration by central management of components
- Pre-calibration of functions within ECU/TCU data sets based on components within the component library
- Central update and distribution of components, which i.e. have been modified during the function development or algorithm design

Advantages at a glance:

- Central management of project-independent parts of ECU/TCU data sets
- Versioning in case of changes of components within the AVL CRETA 6™ Component library (i.e. during the function development)
- Minimization of maintenance work for components
- Simplification of updates for components within referenced projects

Scope of supply:

- License file to activate the software
- Documentation
- Training

Please contact CRETA.Support@avl.com or ask one of our technical offices for further details.

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2. Optional: Additional REST API Server CPU Cores (for CRETA 6 PLUS only)

Customers who have the need to automate and connect to many processes and tools will need to build up an appropriate REST API Infrastructure.
As our REST API base license covers 4 CPU Cores, some customer may have the need to increase the performance of their servers even further.

Scope of supply:

- License file to activate 4 additional CPU Cores on the REST API Server
- Documentation

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