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1 Overview

1.1 Introduction

vMDM (Vector Measurement Data Management) is the solution for efficient management of large data volumes from development, test bench operation and vehicle tests. With vMDM, you can save your measurement data securely, protect it against unauthorized access and simplify the exchange of measurement data between distributed teams. With vMDM, large-scale CPU-intensive analyses, statistical metrics and reports are performed by vMDM without any computational requirements on the engineer’s workstation.

1.2 vMDM Software-as-a-Service (SaaS)

Vector supports you in using vMDM with a new “Software-as-a-Service (SaaS)” offering. Vector provides the necessary infrastructure (hardware, software & highly scalable storage solution), which can be rented by you on a project-specific basis. This eliminates all acquisition and maintenance costs.

All operational services (data backup, application process monitoring and much more) are included in the rental costs. The annual rental costs also include a software update including data migration, so that the latest product features can always be used. Vector Support is available as a contact for professional and technical questions. This enables your department to quickly and easily implement a measurement data management solution at complete cost transparency.

Many security measures (encryption, client separation, ISO 27001) ensure a high level of data security. Selected, globally distributed data centers ensure fast response times.

1.3 Option vMDM for CANape and vSignalyzer

On the user side, vMDM is designed for engineers who work with the Vector tools CANape, vSignalyzer or vMeasure. Data can be imported into vMDM at any time without an additional client license, either from the Vector Tools or with the Vector Shell Extension, simply via the context menu in Windows Explorer.

CANape and vSignalyzer users also get convenient access to measurement data stored and managed in the vMDM Cloud with the separately available Option vMDM. Developers of data analysis and visualization can use the Option vMDM to create and test data in CANape and vSignalyzer and make it available in the vMDM Cloud.

For vMeasure users, access to vMDM is also available without an additional option. The visualization of measurement data recorded with vMeasure and stored in vMDM is thus possible at any time.

1.4 Overview of Advantages

> Secure storage of measurement data from test benches, road testing and endurance testing
> Protection of data through organization of data files in the cloud with user-specific permissions
> Easy searching, filtering and display of measurement data
> Automatic indexing of measurement data on import
> Flexible data indexing based on metadata containing measurement attributes, calculated metrics, and data provided by other systems
> Automated data analysis and reporting without any computational load on the user’s PC
> Project-specific reporting of measurement data and statistical analysis of meta data
> Scalable solution for multi-user environments
> Familiar working environment through seamless integration with the Vector tool landscape. You define scripts, data analytics and data mining functions as usual in vSignalyzer or CANape.
> Minimum IT investment through software-as-a-service architecture
1.5 System Requirements

- Subscription license for vMDM Cloud
- Client computer with CANape/vSignalyzer starting at version 16.0 and Option vMDM license
- Internet access

1.6 Further Information

Various documents are available on the web for vMDM, CANape, vSignalyzer and vMeasure exp. In addition, you will find further valuable expertise in the form of technical articles and application notes. For more information, visit the Vector Download-Center.

2 Basic Functions

- Integration of vMDM in CANape, vSignalyzer and vMeasure for navigation, searches and data transfer
- Automatic upload of measurement data after measurement with CANape and vMeasure exp
- Interactive and automated analysis of the measurement data stored in the vMDM Cloud
- Simple drag & drop export of measurement files from the vMDM Cloud
- Creation of queries for the storage of dynamic search requests
- Export of query results in CSV or Excel format for creation of statistical analyses
- Setup and management of data catalogs and so-called collections as well as of user permissions
- Automated data analysis and report generation in vMDM
- Freely configurable pre-processing when loading measurement files
- Creation of statistical reports in vMDM
3 Uploading Data to the vMDM Cloud

vMDM offers a variety of possibilities to transfer your measurement data into the vMDM cloud. When using the Vector tools CANape and vMeasure exp, you can specify in the recorder configuration whether you want to store the recorded data in a vMDM cloud collection. vMDM then automatically and reliably transfers the data in the background. Short-term or even longer offline states of your measuring computer are accounted for and interrupted transmissions are automatically resumed as soon as a connection to the cloud is available again.

A manual transfer of measurement data is also possible via the Vector Shell Extension. Selected MDF files can be copied or moved to the desired target collection in the cloud with one click.

vMDM also provides automation tools, either via corresponding functions in the CANape / vSignalyzer script language CASL or via the vMDM command line tool if integration into external programs or scripts is required.

4 Measurement Data Index for Optimized Search Operations

With the measurement data index, measurement data can be quickly found, queries for specific views defined and analyses limited to specific measurement data. vMDM determines additional index data during the initial analysis of the measurement files as part of pre-processing. This allows comprehensive classifications and evaluation profiles as well as event counts in categorized measurement files with just a few mouse clicks.

You determine the properties to be indexed individually for each collection by using user-defined properties according to your requirements. This provides you with a powerful tool for describing and structuring your measurement results.
5  Display and Manual Evaluation of Measurement Data

With the vMDM Explorer window in CANape and vSignalyzer, you have direct access to all centrally stored and managed measurement data without having to pass through an external database application or the Windows File Manager.

You use features and metadata that you are free to define yourself to filter and sort even very large volumes of measurement data in seconds in order to solve specific problems. With a single mouse click, and using the proven capabilities of your Vector tool, you can display and analyze the retrieved measurement data quickly and conveniently. Data transfer is performed automatically in the background and a data cache permits accelerated access during recurrent operations on the same data.

Figure 3: Search filters accelerate the search for measurement data with vMDM Explorer in vSignalyzer

6  Automated Data Preprocessing

For each vMDM collection one or several preprocessing steps can be configured, which allow you to automatically perform a user defined analysis of measurement files directly after upload.

A preprocessing step is developed and tested at the workstation in the CANape / vSignalyzer Data Mining Editor. All available analysis tools can be used during preprocessing, such as CASL scripts, virtual measurement file channels and global variables. Analysis results are configured in Analysis Profiles and can then be used later during report creation.

Additional to the creation of analysis data, you can also create or modify meta data of an uploaded measurement file. For example, it is possible to add minimum, maximum or average temperature values from a measurement to the vMDM index or the number of gear shifts performed during a test drive.

With one click you upload the preprocessing step to the cloud and activate it for all new measurement files of the selected vMDM collection.
7 Automated Report Generation

The vMDM reporting function enables you to create meaningful reports about your measurement data according to your needs. The subset of measurement data for which you want to create a report is selected using meta data filters, in the same way as when searching data. This allows you to analyze exactly the data you are interested in, for example a specific time range, one or several variants, test vehicles or test stands, or even specific properties of the unit under test or environment, such as SW version, or maximum ambient temperature during the test drive.

The analysis is based on the analysis results created during preprocessing or the meta data index. This type of data allows an efficient and performant processing compared to the typically large size of measurement files. vMDM reports can be executed in a short time frame, even for large amounts of measurement data.

Report templates created by users can be easily adapted to individual needs, e.g. by modifying the filter criteria or the parameters of the report script. It is also possible to set up a time schedule for repetitive report execution.

Reports are managed in Report Groups, which allow you to manage access to reports independent of the measurement data access rights.

8 Scalable Multi-User Solution

vMDM is scalable as a multi-user system depending on the expected data volume and the required server performance. The measurement data is organized into customer- or project-specific data catalogs known as collections and is securely protected against unauthorized access by means of user-specific roles and permissions.

9 Data Security

The data in vMDM is protected against unauthorized access. vMDM user authorizations, specific read/write permissions and protection against accidental deletion all make secure data management possible.

The operation of vMDM in the cloud provides a high level of data security with a number of different measures (encrypted data transfer, client separation, ISO 27001).

10 Engineering Services

To allow you to concentrate fully on your ECU development activities, Vector supports you both with its expertise and with its tailor-made, fully-fledged solutions for your particular tasks. The range of services extends from consulting, for example for the development of customer-specific analysis scripts, through support during integration and on to site visits by a field application engineer.

11 Training

We offer training courses for CANape and vSignalyzer both in our seminar rooms and on-site at the customer’s premises. You will find more information on the training events and dates on the web at: www.vector-academy.com.
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