To where the digitalisation can lead us in vacuum metrology and service?

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Digital calibration certificates (DCCs) promote all digital calibration workflows as they reduce the necessity for manual interaction with the operator. Automated interpretation of DCCs by computer programs can be achieved if relevant information is referenced by keywords and their meaning is standardized within the metrology community.

The Vacuum Metrology Group of PTB performs about 200 customer calibrations per year. In 2020, the generation of DCCs has been integrated into the automated calibration workflow. To date, more than 600 DCCs have been issued to customers for testing purposes, in addition to the official printed calibration certificates. The generation of XML files for DCCs and LaTeX files for customer correspondence, as well as human readable calibration certificates is carried out using Python and its template system Jinja. At the center of the calibration workflow stands the NoSQL-database CouchDB, facilitating the availability of data on every computer in the lab. Communication with the database is carried out via the HTTP protocol. Where possible, functionality is implemented as web services that can be accessed via RESTful interfaces using the HTTP protocol. User interfaces are implemented using HTML and JavaScript, such that they can be accessed with any browser.

As part of the ongoing effort to harmonize DCCs across all areas of metrology, the Vacuum Metrology Group has been involved in defining Good Practice DCCs (GP-DCCs) for vacuum gauges. These GP-DCCs contain references to all that information in a DCC that is needed for a computer program to process its data. In this way DCCs are not only readable by a computer but can also be interpreted and applied automatically. The keywords used to reference information are made publicly available through a database. The keywords are grouped into namespaces for general purposes and community specific needs. They can also be used for carrying out comparisons that can be evaluated automatically, leading to a harmonization of the applied procedures.