Data backup.nrw

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1. Introduction

In the course of the digitalisation of more and more business processes, universities - organisations in general - are dependent on the availability and persistence of stored data as a basis for their work. Research, teaching and administration are hardly able to act without their respective data. The backup of all data and the ability to restore it quickly when needed are thus supporting pillars of digital sovereignty.

Since this situation is common to all higher education institutions and at the same time the operational requirements are constantly increasing due to the large number of different data-holding systems. Also, the threat to IT supply is increasing rapidly, especially due to cyber-attacks, higher education institutions in North Rhine-Westphalia (NRW) have initiated the project Datensicherung.nrw[1].

The aim of this project is to provide an efficient data backup service for the universities in NRW based on a division of labour. In order to meet this requirement, special attention is paid to the scalability of the concepts and solutions developed.

2. Cross-organisational data protection for NRW universities

The approach to creating effective and efficient data protection is to bundle the service in such a way that a few universities act as service providers for many.

a. Core process data backup and data recovery

The purpose of data backup is to create a copy independent of the data-holding system for the purpose of restoring the last or earlier data status as needed. In the case of cross-university design, the route via the wide-area network in particular presents a challenge for the initial full backup and for large-volume data restores. The daily newly created or changed data can be transferred over the wide-area network without any problems with client-side deduplication of already backed-up data. The same is true for data restores. Large-volume transfers are solved by means of physical data transport if the external connectivity would cause too long transfer times.

b. Supporting processes: Scalability, synergies and quality assurance

The cross-university cooperation allows above all the supporting processes to come to the fore, as the seamless integration of these processes into local conditions and dependencies is a mandatory prerequisite for a high degree of delegation and automation and thus for efficient operation.

A key factor is the distributed responsibility for different steps of the individual processes. For example, it is necessary to carry out client-related operations such as setting up and performing backups and restores or even creating or deleting backup clients at the organisational units where the responsibility for these client systems lies in each case.

[1] https://datensicherung.dh.nrw/de/

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In order to map these responsibilities even in the case of different organisational structures for Datensicherung.nrw, a role model[2][3][4] was developed in close cooperation with IDM.nrw[5] , among others, which is able to map university-central and decentral responsibilities.

For the operational ability to act, which requires corresponding authorisations to actions and to systems on the central web console of the backup platform, this information together with the identity and the context of the role (i.e.: in which institution does which person have which role?) is transferred across the university via the established AAI procedure Shibboleth.

This approach allows - in contrast to information maintained locally in the backup platform - the independent execution of responsibility management itself within each participating university. The assignment of responsibility thus also takes place where the information and the corresponding decision-making authority are available.

The support structure integrated into local processes is also crucial for effectiveness and efficiency: decentralised administrators and end users can contact the local support of the home organisation as usual. This in turn can draw on the network of experts at the level of cross-location support. Because of the diverse issues in the area of data protection, these experts are not limited to the service provider universities; rather, they come from many of the participating universities and also create synergies here by documenting their experiences and results on the common documentation platform[6] .

3. Implementation

For the implementation of the core processes, a concept for a data backup infrastructure[7] was developed with a view to possible cases of damage. On this basis, a backup software was sought that was capable of mapping all requirements against the background of the technical diversity of data-holding systems as well as supporting the physical transport of data. Furthermore, the software must be able to implement the described role model in differentiated authorisations. At the same time, a generic server and storage architecture was developed to ensure the effective operation of the software.

In a Europe-wide tender, the Commvault "Backup and Recovery" software was identified as the most suitable solution, which is operated at RWTH Aachen University on a Hitachi Vantara infrastructure based on HCP object storage distributed across several locations.

By connecting the software to the identity providers of the participating universities, all participants can use the software directly in the web interface provided.

[2] https://datensicherung.dh.nrw/fileadmin/user_upload/datensicherung/Uploads/IdM.NRW_x_DaSi.NRW.pdf
[3] https://doku.idm.nrw/mediawiki/index.php/Rollen
[4] https://doku.idm.nrw/mediawiki/images/8/83/Registrierte_Rollen_IDM.nrw.pdf
[5] https://idm.dh.nrw/
[6] https://doku.dasi.nrw
[7] https://datensicherung.dh.nrw/fileadmin/user_upload/datensicherung/Uploads/Grundkonzept_DSI.pdf

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4. Launch

For most of the participating universities, the backup software, just like the cooperative operating model, represents a serious change. Not only the people directly involved in the core processes are affected, but also management functions to the same extent. Not only do service level agreements (SLAs) have to be reformulated in the terminology of the current software, but the service transfer points between the universities also represent interfaces that have to be redefined. The practical introduction was therefore preceded by intensive role-specific training.

5. Conclusion

Through the combination of efficiently implemented core processes and locally integrable and thus highly scalable support processes, powerful infrastructure in hardware and software as well as extensive training measures, the universities in NRW have built up an effective and efficient cooperative data protection.

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