

Digital repository

Managing and maintaining digital publications and data is a key factor in the development and innovation of institutions. A digital repository offers organizations a comprehensive solution for secure storage, efficient management, and convenient sharing of digital content. The repository allows users to archive and systematically organize diverse digital material, including text documents, images, audio, and video files.

DSpace is a system for managing digital repository. It is utilized on a worldwide basis, used by thousands¹ of organizations, and trusted by many global institutions. Over its more than 20 years of existence, DSpace has undergone significant development and has become a robust tool that meets all the requirements for a digital repository of high quality. Thanks to its features and capabilities, DSpace is an ideal tool for integration with various initiatives² and standards that support access to digital content. Additionally, it has a modern user interface that can be customized based on the specific requirements of the organization.

In the following text, the term "DSpace" refers to a modified version of the vanilla³ DSpace with extended functionality. The enhanced version of DSpace includes additional features that allow users broader customization options according to the specific needs and requirements of the organization. Such DSpace serves as a universal digital repository, meaning it can be deployed as a data or publication repository according to the specific needs of the environment. This version of DSpace is available on the GitHub account⁴ of dataquest s.r.o.

Data Repository: DSpace allows organizations to store and manage various digital content, including scientific results, research, or other datasets. DSpace serves as a central point for collecting, archiving, and providing access to these valuable data, thus promoting innovation and scientific progress.

Publication Repository: In the case of a publication repository, DSpace is used to store and manage scientific articles, conference papers, books, and other publication materials. It provides an efficient way to organize and provide access to scientific information.

¹ <https://registry.lyrasis.org/>

² E.g. The European Open Science Cloud (EOSC) <https://eosc-portal.eu/about/eosc> or Open Access Infrastructure for Research in Europe (OpenAIRE) <https://www.openaire.eu/>

³ https://en.wikipedia.org/wiki/Vanilla_software

⁴ <https://github.com/dataquest-dev/DSpace>, <https://github.com/dataquest-dev/dspace-angular>

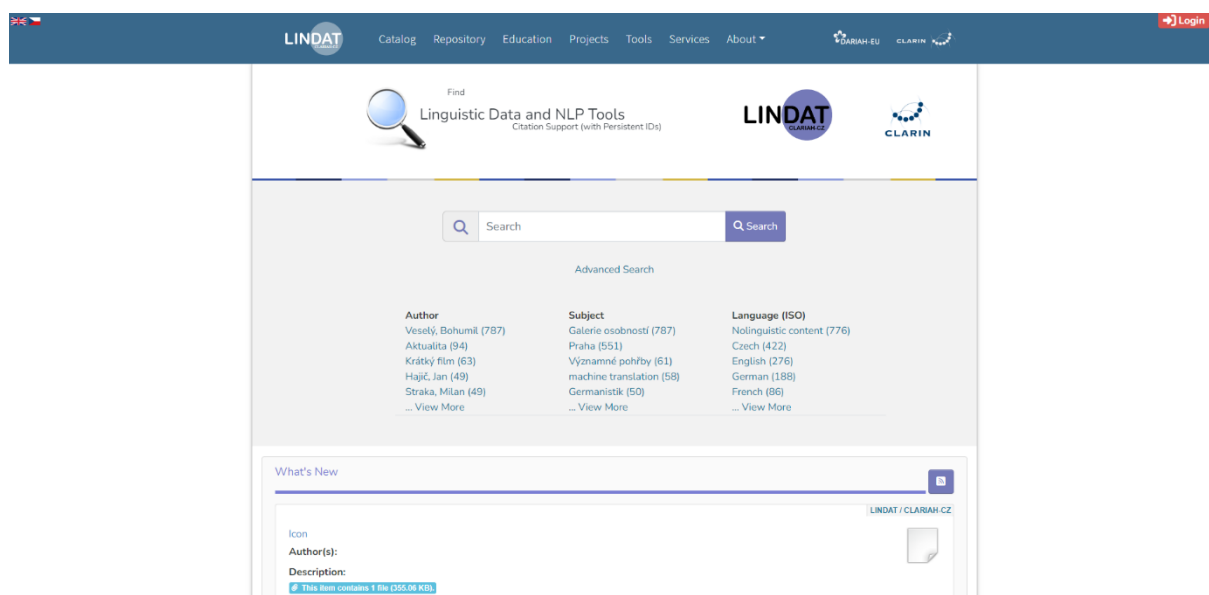


Figure 1: Homepage: LINDAT CLARIAH-CZ

1.1. Features

1. **Open-source:** DSpace is an open-source project, which means that its source code is publicly available and can be modified by a wide community. At the same time, specific modifications can be available exclusively to the customer, so that the source code is available for further modifications, but not publicly shared. This approach not only increases flexibility in customizing the system according to the needs of individual institutions but also prevents a vendor lock-in.
2. **Management of digital objects:** DSpace provides a structured way of storing and organizing various types of digital objects. It helps users maintain an overview of digital resources and enables efficient management of their metadata. DSpace allows efficient grouping, searching, and filtering of digital content based on various criteria.
3. **Open and interoperable standards:** DSpace supports standard and open formats⁵ and protocols, which means that it is capable of integrating with other systems and ensures the long-term sustainability of digital data. Among the standards used by DSpace are, for example, Dublin Core⁶ for metadata and OAI-PMH⁷ or OAI-ORE⁸ for interoperability with other repositories.

⁵ Open format – file format that can be used without legal limitations

https://en.wikipedia.org/wiki/Open_file_format

⁶ <https://www.dublincore.org/>

⁷ <https://www.openarchives.org/pmh/>

⁸ <https://www.openarchives.org/ore/>

4. **Access control:** DSpace supports AAI⁹ and can integrate with a federated SSO¹⁰ systems such as the Slovak Academic Identity Federation safeID¹¹, Czech eduID¹², Switch¹³ or interfederations such as eduGAIN¹⁴.
This integration allows for easy and secure user identification. There is also an option to use the Shibboleth system, which is widely used in academic environments worldwide.
5. **Long-term preservation of digital objects:** The system includes mechanisms for the long-term preservation of digital objects to ensure the integrity and availability of data in the future.
6. **Flexibility and configurability:** DSpace allows users to customize various parts of the system according to the specific needs and requirements of the user or organization. This includes the ability to modify metadata schemas, extend data processing processes, change the user interface, adjust archiving policies, customize input and approval processes, set repository search options, and more.
7. **Statistics:** DSpace allows tracking interest in individual records through integration with Google Analytics¹⁵, Matomo¹⁶ or other similar systems. Subsequently, reports can be generated based on the obtained statistical data.
8. **Modern UI:** DSpace provides a modern user interface that improves overall user satisfaction and simplifies operation when managing and accessing digital materials. Modern user interface technologies and communication with the backend via REST API (see below) allow for efficient modifications in the user interface according to the latest UI development standards. DSpace aims to ensure basic accessibility for people with disabilities, and work is currently underway to further improve and optimize these features.
9. **Flexible REST API:** DSpace features a flexible REST API that allows for easy integration with other systems and tools. This application interface provides extensible and direct access to manipulate digital objects. It provides fast and efficient process automation and supports the development of custom applications. Standard data access additionally protects the institution from potential dependency on a single supplier (vendor lock-in).
10. **Documentation:** DSpace offers comprehensive and easily accessible documentation that provides users, administrators, and developers with a detailed view of all components of the system. Documentation serves as a valuable resource for new users as well as experienced administrators and developers who want to understand and effectively utilize all aspects of DSpace.

Support for FAIR¹⁷ (Findable, Accessible, Interoperable, Reusable): DSpace allows the use of persistent identifiers such as DOI¹⁸ or handles¹⁹ as permanent links to records. The system offers configurable metadata profiles that ensure appropriate metadata for various areas of use. The search system

⁹ https://en.wikipedia.org/wiki/Authentication_and_authorization_infrastructure

¹⁰ https://en.wikipedia.org/wiki/Single_sign-on

¹¹ <https://www.safeid.sk/>

¹² <https://www.eduid.cz/en/index>

¹³ <https://www.switch.ch/en>

¹⁴ <https://edugain.org/>

¹⁵ <https://marketingplatform.google.com/about/analytics/>

¹⁶ <https://matomo.org/>

¹⁷ <https://www.go-fair.org/fair-principles/>

¹⁸ <https://www.doi.org/>

¹⁹ <https://handle.net/>

subsequently ensures efficient finding of these records. Interoperability is ensured by supporting standard data and metadata formats, enabling integration with other systems and increasing the potential for collaboration. Interoperable standards ensure that digital objects are found, and the AAI (Authentication and Authorization Infrastructure) system allows defining access policies. DSpace also includes a citation box that supports various citation formats and is compliant with RDA/FORCE11²⁰ recommendations, which makes correct citing possible and simple.

DSpace supports certification of trustworthy digital repositories CTS²¹ by fulfilling and adhering to relevant standards therefore enabling implementations of required procedures and policies.

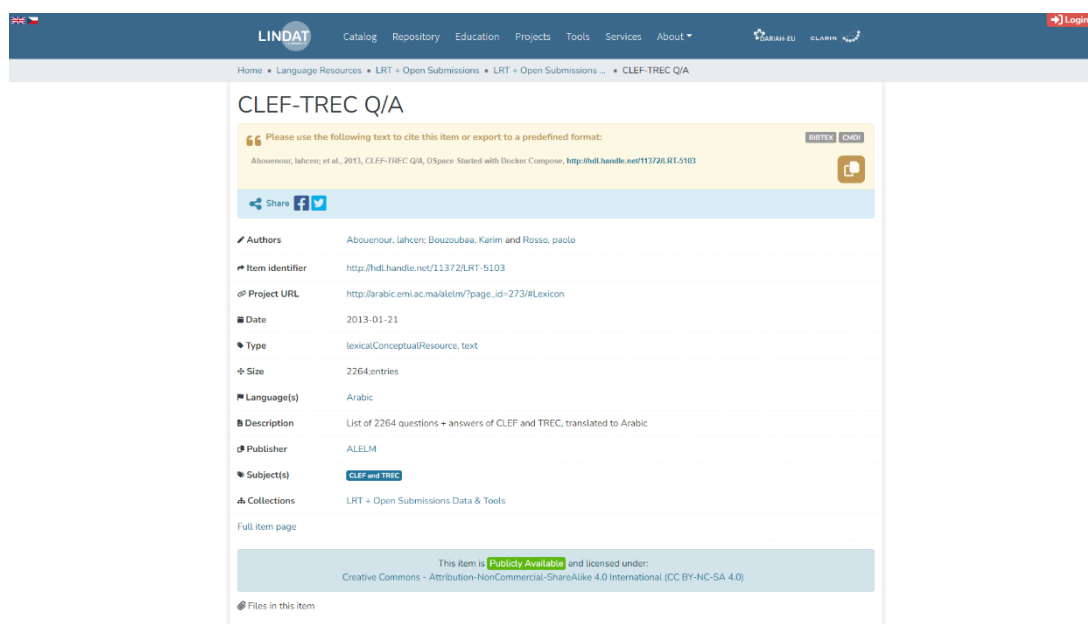


The screenshot shows the DSpace interface for a specific publication. At the top, there is a navigation bar with 'TUL' logo, 'COMMUNITIES & COLLECTIONS', 'ALL OF DSPACE', and 'STATISTICS'. A search bar and 'LOG IN' link are also present. Below the navigation bar, a breadcrumb trail reads: 'Home • Vysokoškolské práce • Bakalářské a diplomové... • Fakulta mechatroniky, in... • Dimenzování rezistorů p...'. The main title is 'Dimenzování rezistorů při mžikovém zatížení'. Below the title, the 'Title Alternative' is 'Dimensioning of resistors for transient pulse'. A small thumbnail image of the document cover is shown on the left. To the right of the thumbnail, the citation information is displayed: 'HEIDLER, Roman a NOVÁK, Miroslav. *Dimenzování rezistorů při mžikovém zatížení*. Technická Univerzita v Liberci. 2011. Dostupné také z: <https://dspace.tul.cz/handle/15240/9920>. Below this, there is a dropdown menu for 'Citační styl:' set to 'ČSN ISO 690' and a button 'Uložit do Citace PRO'. The page is divided into two columns. The left column contains metadata: 'Files' (with links to 'bc_20212.pdf(1.32 MB)', 'opo_20212.pdf(26.9 KB)', 'ved_20212.pdf(26.9 KB)', and 'obh_20212.pdf(26.9 KB)'), 'Date' (2011), 'Authors' (Heidler, Roman), and 'Publisher' (Technická Univerzita v Liberci). The right column contains: 'Description' (katedra: MTI; přílohy: 1xCD; rozsah: 54), 'Subject(s)' (resistor, dinemision of resistors, model of resistor, transient pulse, step-start, rezistor, dimenzování rezistorů, model rezistoru, krátkodobé zatížení, stupňový spouštěč), 'Item identifier' (<https://dspace.tul.cz/handle/15240/9920>), and 'Collections' (Fakulta mechatroniky, informatiky a mezioborových studií). At the bottom of the right column is a button 'Show full item record'. The footer of the page contains copyright information: 'DSpace software copyright © 2002-2024 LYRASIS', 'Contact us', 'Cookie settings', 'Send Feedback', and 'Theme by + dataquest'.

Figure 2: Item page (publication) Technical University of Liberec

²⁰ <https://force11.org/> and <https://www.rd-alliance.org/>

²¹ Core Trust Seal: <https://www.coretrustseal.org/about/>



The screenshot shows the LINDAT CLARIAH-CZ digital repository interface. The page title is 'CLEF-TREC Q/A'. It features a navigation bar with 'LINDAT' and 'CLARIAH-CZ' logos, and a 'Login' button. The main content area includes a citation instruction, a citation text, and social sharing options. Below this is a metadata table with the following details:

Authors	Abouenour, lahcen; Bouzoubaa, Karim and Rosso, paolo
Item identifier	http://hdl.handle.net/11372/LRT-5103
Project URL	http://arabic.emi.ac.ma/alelm/?page_id=273/#Lexicon
Date	2013-01-21
Type	lexicalConceptualResource, text
Size	2264 entries
Language(s)	Arabic
Description	List of 2264 questions + answers of CLEF and TREC, translated to Arabic
Publisher	ALELM
Subject(s)	CLEF and TREC
Collections	LRT + Open Submissions Data & Tools

At the bottom, there is a notice: 'This item is Publicly Available and licensed under: Creative Commons - Attribution-NonCommercial-ShareAlike 4.0 International (CC BY-NC-SA 4.0)'. A 'Files in this item' section is also visible.

Figure 3: Data item page: LINDAT CLARIAH-CZ

1.2. Types of users

Administrator: Has full permissions to manage and configure the entire system. The administrator can create and manage collections, user accounts, define access policies, and perform other administrative tasks.

Collection Administrator: Responsible for managing a specific collection of digital objects. They can create, delete, or modify items within the collection and define access policies for them.

Submitter: Has permissions to add new digital objects to the repository.

Reviewer: Evaluates submitted records. They may be assigned to approve digital objects before they are included in the repository. This role is often present in systems with public content submission.

Regular User: Has limited permissions, allowing them to browse and search digital objects. They may have access to public collections and content but do not have the right to add or modify content.

Anonymous User: Has access only to public information and content and does not have permissions to create, modify, or remove digital objects.

The screenshot displays the LINDAT digital repository interface. On the left, a dark sidebar titled "Management" contains various administrative options: New, Edit, Import, Submissions, Export, Access Control, Admin Search, Registries, Curation Task, Processes, Administer Workflow, Manage Handles, License Administration, Health, System-wide Alert, and Unpin sidebar. The main content area features a header with the LINDAT logo and navigation links (Catalog, Repository, Education, Projects, Tools, Services, About). Below the header, there is a quote by Ludwig van Beethoven: "There ought to be only one grand dépôt of art in the world, to which the artist might repair with his works, and on presenting them receive what he required...". The central part of the page is a search interface with a search bar and a "Search" button. Below the search bar, there is an "Advanced Search" section with three columns of filters: Author (Veselý, Bohumil (787), Aktualita (94), Krátký film (63), Hájíč, Jan (49), Straka, Milan (49), ... View More), Subject (Galerie osobností (787), Praha (551), Významné pohľby (61), machine translation (58), Germanistik (50), ... View More), and Language (ISO) (Nolinguistic content (776), Czech (422), English (280), German (188), Spanish (89), ... View More). At the bottom, there is a "What's New" section with a "Description:" field and a link to "This item contains 1 file (355.06 KB)".

Figure 4: Context menu on the left side

2. Target audience of DSpace

DSpace is intended for various types of organizations and institutions looking for efficient solutions for managing, preserving, and sharing digital objects and information. DSpace can serve as a significant platform for presenting and showcasing research results and academic work. By allowing organizations to share their scientific publications, conference papers, and other significant materials, DSpace becomes a digital exhibition space where institutions can present their innovations, scientific discoveries, and work. DSpace plays a crucial role in the context of citations. Citations play an important role in strengthening the research impact and reach of an academic institution. Citations directed to research results are stored in a digital repository, creating references to works and projects of employees. This not only highlights the academic importance of the institution but also contributes to the dissemination of knowledge and scientific discoveries to the wider community. Increased visibility subsequently provides an opportunity for professionals, students, and the public to discover and utilize research results. This makes the institution a center of information and knowledge, attracting the interest of professionals and students.

Ultimately, increased interest in the institution through the repository improves awareness of it, attracts new talented individuals, and contributes to the development of scientific and academic potential. The repository thus becomes a key tool for enhancing the institution's prestige, increasing its competitiveness, and supporting its strategic goals.

The main target groups include:

Libraries and archives: DSpace provides efficient solutions for managing digital library collections, while also ensuring long-term preservation of digital objects, therefore making sure that they remain accessible and preserved over the long term.

Research institutions: Storing and sharing research publications and data.

Universities and education: Organizing digital teaching materials and research results.

Organizations and companies: Storing corporate documents, presentations, and digital records.

Governmental organizations: Governmental organizations can use DSpace for storing and managing public information, datasets, and other digital documents.

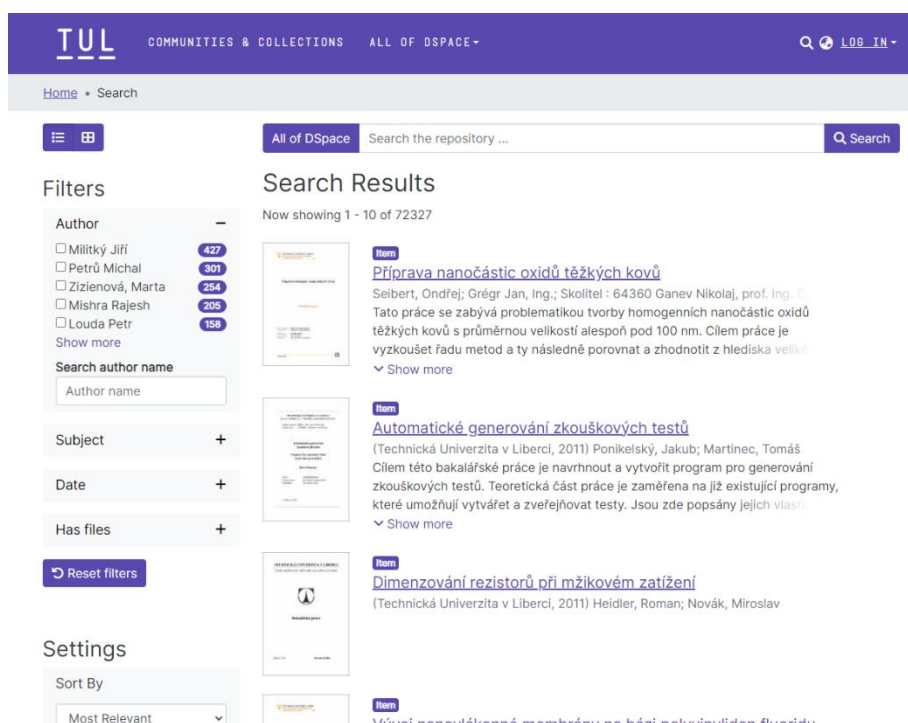


Figure 5: Repository search: Technical University of Liberec

3. List of images

In this section, a list and brief description of the images used in the document, originating from various implementations of the DSpace system by Dataquest s.r.o., are provided.

Image 1: Homepage: LINDAT CLARIAH-CZ (page 2)

An example of the homepage of a DSpace repository in the LINDAT CLARIAH-CZ project. The homepage, as well as other pages, can be customized based on specific customer requests.

Image 2: Item page (publication): Technical University Liberec (page 4)

The publication item page in the repository of the University Library at the Technical University of Liberec displays information about the item in a simplified structure with the option to view complete information. The ability to automatically save citations to Citace PRO was developed based on customer request.

Image 3: Data item page: LINDAT CLARIAH-CZ (page 4)

The data item page in a simplified structure. At the top, there is an option to save citations to the clipboard in various citation standards.

Image 4: Context Menu on the Left Side (page 5)

The administrator has access to a wide range of options for repository management. Through the administrator menu, they can manage content, users, run various scripts, view the current system status, publish messages and alerts to users, or modify the repository structure. Other logged-in users also have access to the context menu, but to a lesser extent than the administrator.

Image 5: Repository search: Technical University of Liberec (page 7)

Repository search can be customized according to specific customer requirements. The image shows an example search within the University Library repository.

4. Deployment process

Consultation: We will evaluate your requirements together to ensure optimal customization of the system to the organization's needs.

Installation and Configuration: We ensure a smooth deployment of an application and we set up DSpace according to the specific requirements and processes of your organization.

Customization: If you need custom modules or extensions, we will ensure that DSpace fully meets your specific requirements.

Data Migration: We pay attention to the data migration process, focusing on the safe and efficient transfer of existing information to the new version of the system. Carefully planned and managed migration contributes to preserving metadata, digital objects, and settings. Without data loss, it ensures a smooth transition to an enhanced version of DSpace.

Training: Our experts will provide professional training for selected types of users (see section 1.2) in your organization, from users to administrators.

Technical Support: We ensure system supervision, monitoring, and service prophylaxis.