



MAX PLANCK
digital library

KEEPER: CERTIFYING RESEARCH DATA COMBINING SEAFILE AND BLOCKCHAIN TECHNOLOGY

CS3 2023
Rene Ranger & Vlad Makarenko

KEEPER – SYNC & SHARE AND ARCHIVING

- MPG INSTITUTES
80+
- ACTIVATED USERS
5.272
- LIBRARIES / FILES
17.390 / 75.833.692
- STORAGE USED
179 TB (CA. 240TB W/ HISTORY)

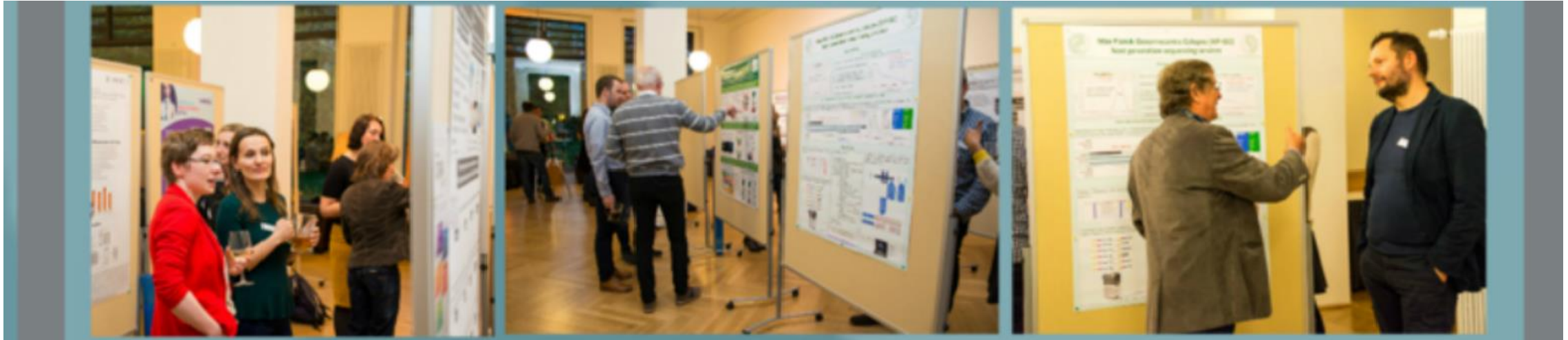


THE MAX PLANCK DIGITAL LIBRARY – WHAT WE (ALSO) DO

SERVICES FOR THE MAX PLANCK RESEARCHERS

- BASIC PROVISION WITH SCIENTIFIC INFORMATION (JOURNALS, EBOOKS, DATABASES...)
- BASIC PROVISION OF RESEARCH SERVICES (SOFTWARE, TOOLS, INFRASTRUCTURE)
- STRATEGIC SERVICES: CONTRIBUTION TO NATIONAL AND INTERNATIONAL INITIATIVES (OA2020, DEAL, **BLOXBERG**)

WHERE WE GET IDEAS FOR NEW SERVICES



“With a **watermark** on my research data, I would be much more relaxed and share my results more often!”

“... as a researcher I want to **protect** my ideas, findings or collected data, as early in the research process as possible, so I don't have to worry about rushing to publish my research data or being scooped...”

WHY PROTECTING INTELLECTUAL PROPERTY MATTERS

CHALLENGES IN SCIENCE:

- HIGH PRESSURE TO PUBLISH FAST
- IP CAN BE STOLEN
- “WHO WAS FIRST?”

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CHALLENGES IN SCIENCE:

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OUR SOLUTION:



IP



Blockchain

STEP 1: THE GENESIS OF BLOXBERG FEBRUARY 2019



Max Planck Society, Carnegie Mellon University, IT University of Copenhagen, University of Johannesburg, University of Nicosia, Georgia Tech, ETH Zurich, University of Kassel, University of Sarajevo, University College London

BLOXBERG CONSORTIUM MEMBERS

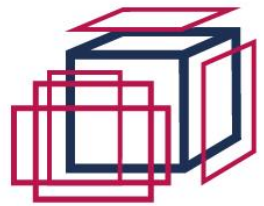
50
+



AND MORE...

STEP 2: BLOXBERG ASSOCIATION FOUNDED OCTOBER 2022





KEEPER

&

bloXberg



New Library More

Search Files

Files

- My Libraries
 - Shared with me
 - Shared with groups
 - Library Details
- Tools
- Favorites
 - Activities
 - Linked Devices
 - Share Admin

My Libraries

Name	Size	Last Update
My Library	27.6 MB	a minute ago





File management icons: folder, copy, delete, download, menu, grid, calendar, info

Search files in this library [input field] [notification icon] [user profile icon]

- Files
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Libraries / My Library

<input type="checkbox"/>		Name	Size	Last Update
<input type="checkbox"/>	☆	📁 Emails		3 hours ago
<input type="checkbox"/>	☆	📄 ZoomInstaller.exe	14.2 MB	3 hours ago
<input type="checkbox"/>	☆	📄 bloxberg blockchain.pptx	7.7 MB	3 hours ago
<input type="checkbox"/>	☆	📄 Keeper_Storage_Estimation.xlsx	487.4 KB	3 hours ago
<input type="checkbox"/>	☆	📄 cared-data-certificate_1176.pdf	201.2 KB	3 hours ago
<input type="checkbox"/>	☆	📄 api2_tokenv2.csv	169.0 KB	3 hours ago
<input type="checkbox"/>	☆	📄 testautomation.pdf	134.6 KB	3 hours ago
<input type="checkbox"/>	☆	📄 Image Pasted at 2022-11-8 14-28.png	32.0 KB	3 hours ago
<input type="checkbox"/>	☆	📄 Begründung.docx	13.7 KB	3 hours ago
<input type="checkbox"/>	☆	📄 archive-metadata.md	1.5 KB	3 hours ago



- Files
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Libraries / My Library

<input type="checkbox"/>	Name	Size	Last Update
<input type="checkbox"/>	★ Emails		22 minutes ago
<input type="checkbox"/>	★ ZoomInstaller.exe	14.2 MB	24 minutes ago
<input type="checkbox"/>	★ bloxberg blockchain.pptx	7.7 MB	24 minutes ago
<input type="checkbox"/>	★ Keeper_Storage_Estimation.xlsx	487.4 KB	23 minutes ago
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<input type="checkbox"/>	★ archive-metadata.md	1.5 KB	22 minutes ago

Certify your file via the bloxberg blockchain.

Certify your file via the bloxberg blockchain.

KEEPER
TEST SERVER

Upload New Share Archive Certify Metadata

Libraries

Files

- My Libraries
- Shared with me
- Shared with groups
- Library Details

Tools

- Favorites
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Project Catalog Help / Knowledge Base About

Edit Metadata for My Library library

Title: *

Author: First Name: Last Name: + *

Affiliation:

Publisher: *

Description: *

Year: *

Institute: Institute name: Department: *

Search files in this library

Size	Last Update
	2 minutes ago
14.2 MB	3 minutes ago
7.7 MB	4 minutes ago
487.4 KB	2 minutes ago
201.2 KB	a minute ago
169.0 KB	3 minutes ago
134.6 KB	4 minutes ago
32.0 KB	4 minutes ago
13.7 KB	2 minutes ago
1.5 KB	a minute ago

Help



- Upload
- New
- Share
- Archive
- Certify**
- Metadata

Search files in this library

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Libraries / My Library

<input type="checkbox"/>		Name	Size	Last Update
<input type="checkbox"/>	☆	📁		2 minutes ago
<input type="checkbox"/>	☆	📄	14.2 MB	3 minutes ago
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<input type="checkbox"/>	☆	📄	487.4 KB	2 minutes ago
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- Certify
- Metadata

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Libraries /

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<input type="checkbox"/>		4 minutes ago
<input type="checkbox"/>		4 minutes ago
<input type="checkbox"/>		2 minutes ago
<input type="checkbox"/>		a minute ago

Certify My Library

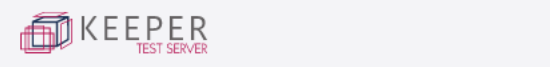
Certify all files within the library via the bloxberg blockchain. A new entry under "Library Details" on the left sidebar will be created, where you can access the certified version and the file and a proof of certification. Certifying may take some time, depending on the size of the library. Adding metadata is optional, but recommended.

[Certify](#)

Certify My Library

Certify all files within the library via the bloxberg blockchain. A new entry under "Library Details" on the left sidebar will be created, where you can access the certified version and the file and a proof of certification. Certifying may take some time, depending on the size of the library. Adding metadata is optional, but recommended.

[Certify](#)



Upload New Share Archive

✓ Your files with the library My Library are currently being certified. We will inform you once the task has successfully finished. This may take a while.

- Files
- My Libraries
- Shared with me
- Shared with groups
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Libraries / My Library


<input type="checkbox"/>	Name	Size	Last Update
<input type="checkbox"/>	✪ Emails		2 minutes ago
<input type="checkbox"/>	✪ ZoomInstaller.exe	14.2 MB	3 minutes ago
<input type="checkbox"/>	✪ [redacted]	7.7 MB	4 minutes ago
<input type="checkbox"/>	✪ [redacted]	487.4 KB	2 minutes ago
<input type="checkbox"/>	✪ [redacted]	201.2 KB	a minute ago
<input type="checkbox"/>	✪ [redacted]	169.0 KB	3 minutes ago
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<input type="checkbox"/>	☆	📄 archive-metadata.md	1.5 KB


 This notice verifies that testranger3 certified the files within the library My Library via the bloxberg blockchain. Additional information like the files and the corresponding certificates can be found at [My Library](#).

a few seconds ago

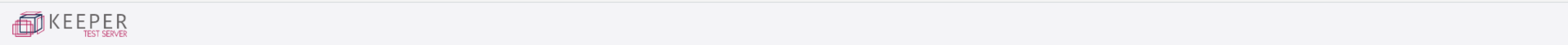
Notifications

 This notice verifies that testranger3 certified the files within the library My Library via the bloxberg blockchain. Additional information like the files and the corresponding certificates can be found at [My Library](#).

a few seconds ago

 Your files with the library My Library are currently being certified. We will inform you once the task has successfully finished.

3 hours ago



This is a test

Test certification to showcase bloxberg cert

Author(s): Ranger, R.

Year: 2023

bloxberg Transactions

Name	Date	Link
My Library	2023-02-07 11:38:05	Link to certificates
cared-data-certificate_1176.pdf	2023-02-07 11:37:24	Link to certificate

Contact: testranger3@gmail.com

My Library Snapshot (2023-02-07 08:59:14)

Added "cared-data-certificate_1176.pdf" | keeper 2 hours ago

Current path: My Library

Name	Size	
📁 Emails		
📄 api2_tokenv2.csv	169.0 KB	Download Certificate Download File
📄 archive-metadata.md	1.5 KB	
📄 Begründung.docx	13.7 KB	
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This is a test

Test certification to showcase bloxberg cert

Author(s): Ranger, R.

Year: 2023

Transaction: 0x853b62c795c5699b0a35a84110b5810cc26de66940419d00e8aade7ac966daec/54a...

[Download File](#)

[Download Certificate](#)




Issued on Feb 7, 2023 by mpdl.berg
Certified by the bloxberg Consortium




[View Recipient](#)

Verified
This is a valid bloxberg certificate.


[Verify again](#)



Issued on Feb 7, 2023 by mpdl.berg
Certified by the bloxberg Consortium

-  **Format validation**
[4 Items](#)
-  **Hash comparison**
[3 Items](#)
-  **Verified**
This is a valid bloxberg certificate.
[View transaction link](#)

This certificate has been verified on the bloxberg blockchain.



bloxberg Research Certificate

This bloxberg certificate serves as a proof of existence for the identifier were transacted on the bloxberg blockchain.

Cryptographic Identifier

54a463f8700e7624e73db4b1ad7cbd6af323a72e846b554abc2efc0b39b500ae

Transaction ID

0x853b62c795c5699b0a35a84110b5810cc26de66940419d00e8aade7ac966daec

Timestamp

2023-02-07T10:37:30.362714

Merkle Root

ec573a99852d0e5c6f38386e60851bc85db442752e07ce86d89a51597fd0f4b9





This is a test

Test certification to showcase bloxberg cert

Author(s): Ranger, R.

Year: 2023

Transaction: 0x853b62c795c5699b0a35a84110b5810cc26de66940419d00e8aade7ac966daec

[Download File](#)

[Download Certificate](#)



Issued on Feb 7, 2023 by mpdl.berg
Certified by the bloxberg Consortium

[View Recipient](#) >

Verified
This is a valid bloxberg certificate.

[Verify again](#)

[Verify another record](#)

Research Object Certificate

This bloxberg certificate serves as a proof of existence that the data corresponding to the cryptographic identifier were transacted on the **bloxberg** blockchain at the issued time.

<p>Cryptographic Identifier 54a463f8700e7624e73db4b1ad7cbd6af323a72e846b554abc2efc0b39b500ae</p> <p>Transaction ID 0x853b62c795c5699b0a35a84110b5810cc26de66940419d00e8aade7ac966daec</p> <p>Timestamp 2023-02-07T10:37:30.362714</p> <p>Merkle Root ec573a99852d0e5c6f38386e60851bc85db442752e07ce86d89a51597fd0f4b9</p>	
---	--



ResearchObjectCertification

Token ID: 15220

ERC-721 1 Transfers



Token Transfers

Token Transfers		Page 1
Token Minting	0x853b62c795c5699b0a35a84110b5810cc26de66940419d00e8aade7ac966daacc 0x00 → 0x1EC2f66dFdA438B9F8523EcFc7676f192DDBBb27 TokenID [15220] ROC	Block #19132901 5 minutes ago

Page 1




Research Object Certificate

This bloxberg certificate serves as a proof of existence that the data corresponding to the cryptographic identifier were transacted on the **bloxberg** blockchain at the issued time.


<p>Cryptographic Identifier 54a463f8700e7624e73db4b1ad7cbd6af323a72e846b554abc2efc0b39b500ae</p> <p>Transaction ID 0x853b62c795c5699b0a35a84110b5810cc26de66940419d00e8aade7ac966daec</p> <p>Timestamp 2023-02-07T10:37:30.362714</p> <p>Merkle Root ec573a99852d0e5c6f38386e60851bc85db442752e07ce86d89a51597fd0f4b9</p>	
---	--



View the transaction at <https://blockexplorer.bloxberg.org>Verify the certificate at <https://certify.bloxberg.org/verify>

Research Object Certification 0.4.0 OAS3



[/openapi.json](#)

Authorize 


certificate Creates, transacts, and signs a research object certificate on the bloxxberg blockchain. Hashes must be generated client side for each desired file and provided in an array. Each hash corresponds to one research object certificate returned in a JSON object array. 

POST `/createBloxxbergCertificate` Createbloxxbergcertificate  


pdf Accepts as input the response from the createBloxxbergCertificate endpoint, for example a research object JSON array. 



POST `/generatePDF` Generatepdf  



research_object_v1 Returns Context JSON schema for Version 1 of Research Object Certificate 



GET `/research_object_certificate_v1` Research Object Certificate V1 

_auth 

GET `/auth/new` Get New Api Key  

GET `/auth/revoke` Revoke Api Key  

GET `/auth/renew` Renew Api Key  

GET `/auth/logs` Get Api Key Usage Logs  



THANK YOU FOR YOUR ATTENTION

get in touch:

bloxberg.org

keeper.mpdl.mpg.de / keeper@mpdl.mpg.de

Max Planck Digital Library

E-Mail: ranger@mpdl.mpg.de

Internet: www.mpdl.mpg.de