



Ministry of Education, Culture and
Science

Mediachain pilot



A distributed
network of
digital heritage
information



The Dutch Digital Heritage Network (NDE) aims at increasing the social value of the (digital) heritage information maintained by libraries, archives, museums and other cultural heritage institutions by improving the sustainability, the usability and the visibility of digital heritage information.

Realizing a distributed network of digital heritage information is one of the long term goals NDE is pursuing. Adopting the Linked Data principles is a strategic approach in this ambition. In a short pilot we explored the capabilities of the current state-of-the-art distributed technologies and evaluated its possible contribution to the Linked Data approach. We selected Mediachain's technological stack for this purpose because it is focussed on the cultural domain and integrates both blockchain (Blockstack) and IPFS technology.



Our challenge



About 1500 heritage
institutions in our
network



Digital heritage
information consists of
many disparate pieces



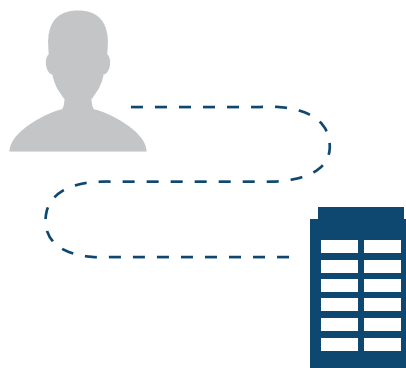
Maintained in a complex
landscape of
management systems,
aggregators, websites
and portals



Our challenge



Users have a hard
time finding our
information



Large distance
between maintainer
and user of the
information



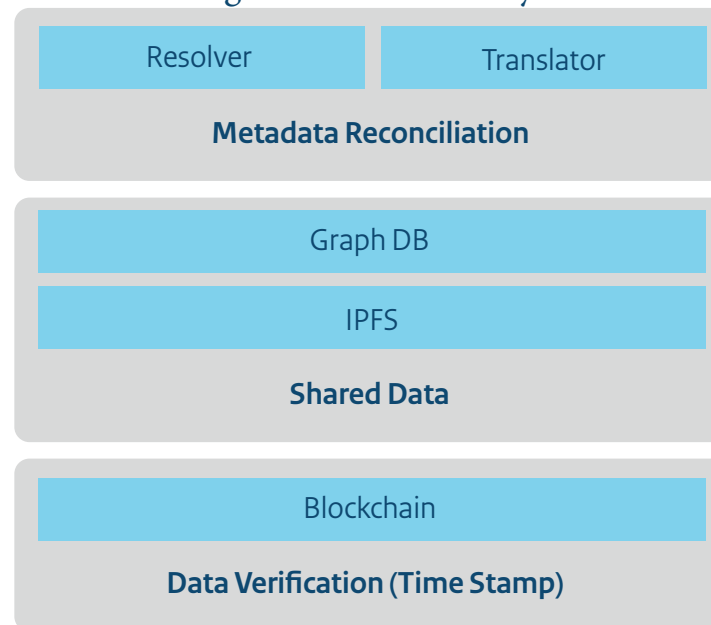
Information about
provenance and rights is
often unclear



Mediachain to the rescue?

Mediachain combines IPFS, blockchain and cultural heritage data

Original architecture layout:





Research questions



Can Mediachain
simplify access to
digital heritage
information?

Can Mediachain
improve transparency
for provenance and
rights information?

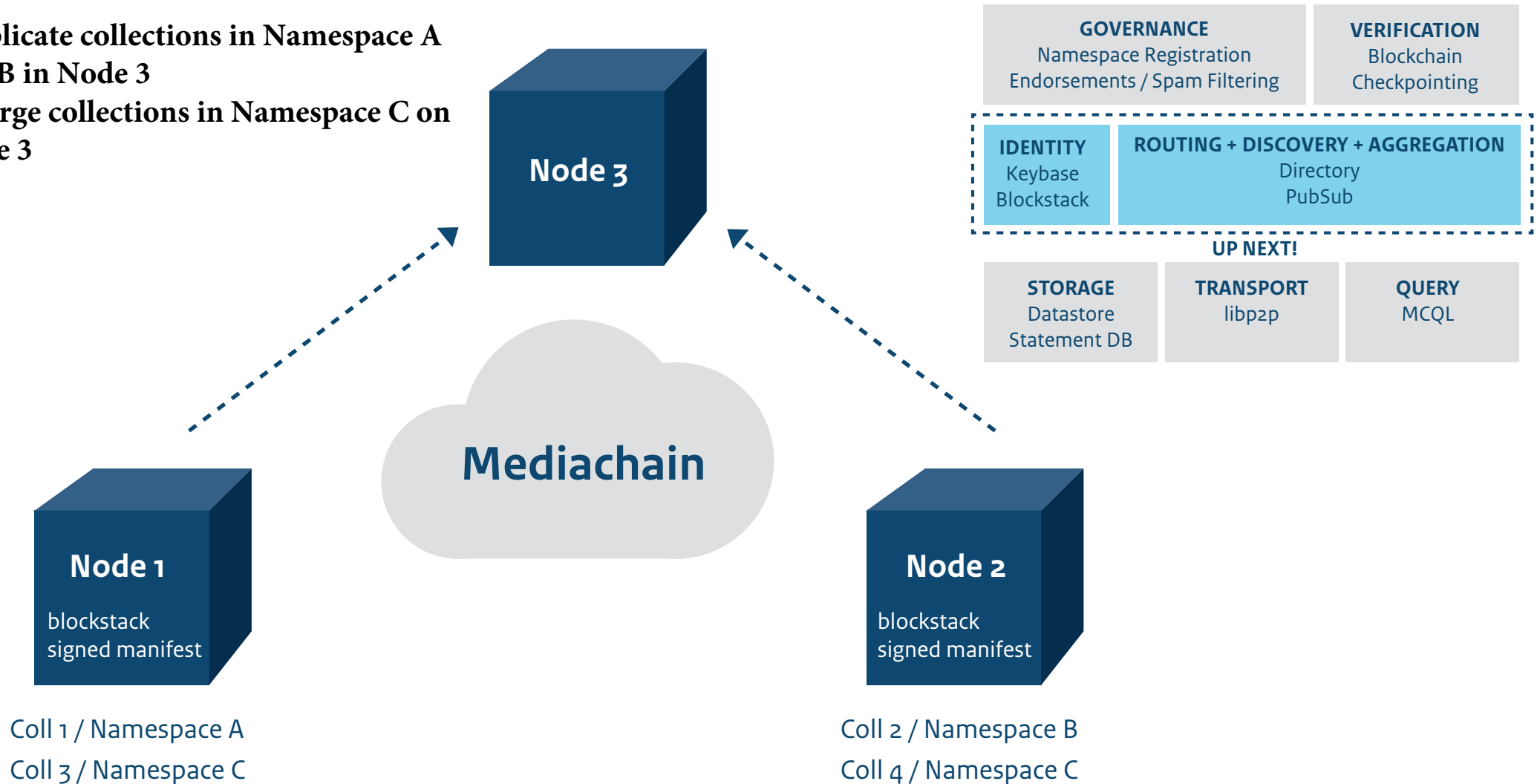
Can Mediachain be
used for publishing
Linked Data in the
distributed web?

Does IPFS
technology used in
Mediachain offer
benefits for
publishing Linked
Data?



Setup for the Mediachain pilot

- * replicate collections in Namespace A and B in Node 3
- * merge collections in Namespace C on Node 3





Setup for the Mediachain pilot

Name digitaalerfgoed.id | Blocksta... ✕ +

https://explorer.blockstack.org/name/digitaalerfgoed.id 80% Zoeken

BLOCKSTACK Names Blocks Status Search for name, block, tr

digitaalerfgoed.id

Owner 37cevAv2a5eAGDapeSCAYjsA2TjPdjeiW

Summary

Value Hash	8e8f67425c08fe05e571e2c3c9...	First Registered	456812
Expires	562002	Preordered	
Last Renewed	456812		
Revoked	false		

Zone File

```
{ "txt": [ { "_missing_class": true, "class": "IN", "name": "pubkey", "txt": "pubkey:data:02921122a8bae8a1b7e99" }
```

History

- BLOCK #456823
- BLOCK #456812

```
mediachain@mediachain-node3:~$ blockstack lookup digitaalerfgoed.id
{
  "profile": {
    "@type": "Person",
    "account": [
      {
        "contentUrl": "http://www.den.nl/nde",
        "identifier": "CAESID2aK2tV3B5V8Vw6ZooB1Q1qrE6a8AKfCG6gmjgo2RPFK"
      },
      {
        "contentUrl": "http://www.den.nl/nde",
        "identifier": "CAESINyaGvJf4tSblbsmPMqtCS1ShUHqzx2Q65NZYLFs6K8q"
      },
      {
        "node": "node2",
        "service": "mediachain"
      }
    ],
    "accounts": [],
    "timestamp": 1489524206.858167
  },
  "zonefile": "$ORIGIN digitaalerfgoed.id\n$TTL 3600\npubkey TXT \"pubkey:data:02921122a8bae8a1b7e993b6f723950820dc3d94e2701e84da154b29fd9fc8cf\\n_file URI 10 1 \\\"file:///home/mediachain/.blockstack/storage-disk/mutable/digitaalerfgoed.id\\n_https_tcp URI 10 1 \\\"https://blockstack.s3.amazonaws.com/digitaalerfgoed.id\\n_http_tcp URI 10 1 \\\"http://node.blockstack.org:6264/RFC2#digitaalerfgoed.id\\n_dht_udp URI 10 1 \\\"dht+udp://b439497840b952165c402c5537589752495b2dc2\\n\\n\"
}
```

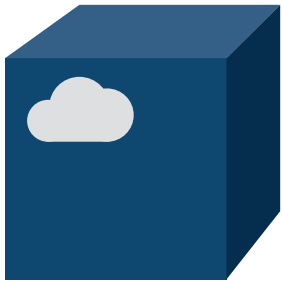
NAME_REGISTRATION



Results



Results



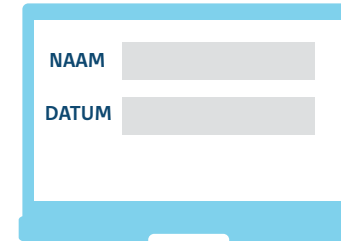
Mediachain uses a limited part of the IPFS technology



Mediachain adds an extra layer of metadata to the stored object



Sharing of data is limited to copying and merging data



Discovery of datasets is limited, content is addressed through namespaces



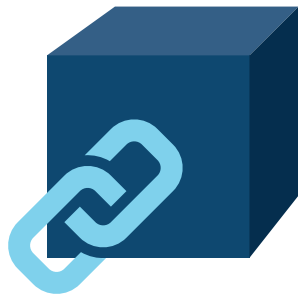
Querying of the stored data is very limited



Results



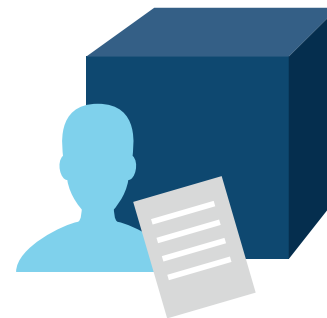
Querying using original key/value pairs is not possible



Linked Data is stored as a blob: properties and values cannot be addressed



Mediachain offers no added value for storing Linked Data



Mediachain nodes can be signed with Blockstack identities



But extra functionality for working with identities was not yet available



General observations



General observations



Available functionality
less than suggested by
the documentation



Mediachain is still
in development



Documentation is not
always up to date



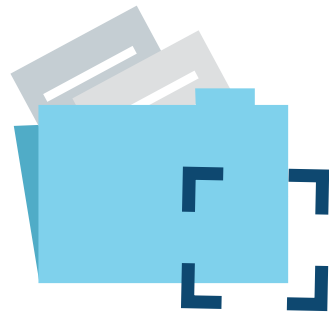
But excellent support
on Slack



General observations



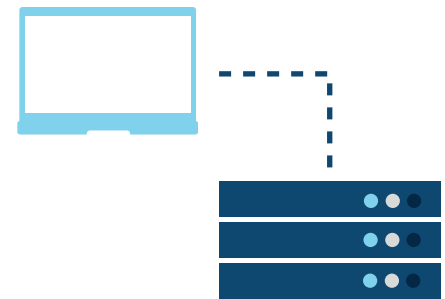
Developers were open and enthusiastic about our use case



But strong focus on their own use case



Little attention for the theoretical aspects of the usecase, very pragmatic approach



In general quite isolated developments, researchers are not involved yet?



Conclusions



Conclusions



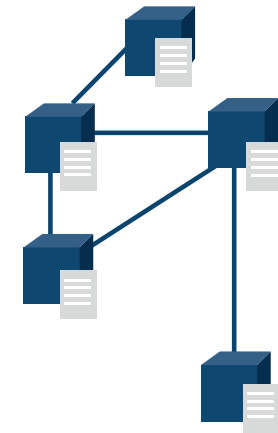
The Mediachain stack offers limited functionality and no added value for our use case.



Linked Data is being treated as blobs of data, browsing or querying Linked Data is not possible.



Real potential of IPFS cannot be evaluated through this pilot by limited implementation of IPFS in Mediachain



Mediachain demonstrates a first step for distributed storage of data integrated with blockchain functionality



Conclusions



Fast moving area, core developers now working at Spotify.



Potential added value of IPFS for our usecase should be investigated further.



And we should follow the developments in the blockchain technologies for our domain.

