The Blockchain in Education

PESC 2017 Data Summit

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www.learningmachine.com

Lifelong learning and achievement.

An individual's lifetime of education does not reside entirely within one organization. Not only do people attend a variety of schools, but learning happens outside of formal schooling and continues over a lifetime.

Chapter 1

Overview of blockchain-based records and their technical standards.

Every institution generates records about people that aren't easily used or verified.

Problems

— Time and Expense

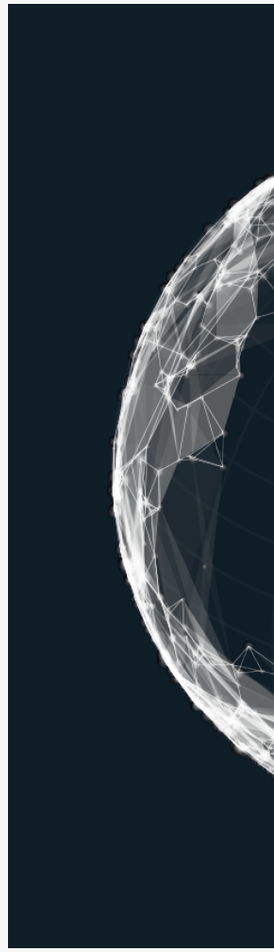
— Lack of Ownership

— Single Point of Failure

Learner-owned records,
verifiable with a decentralized network.

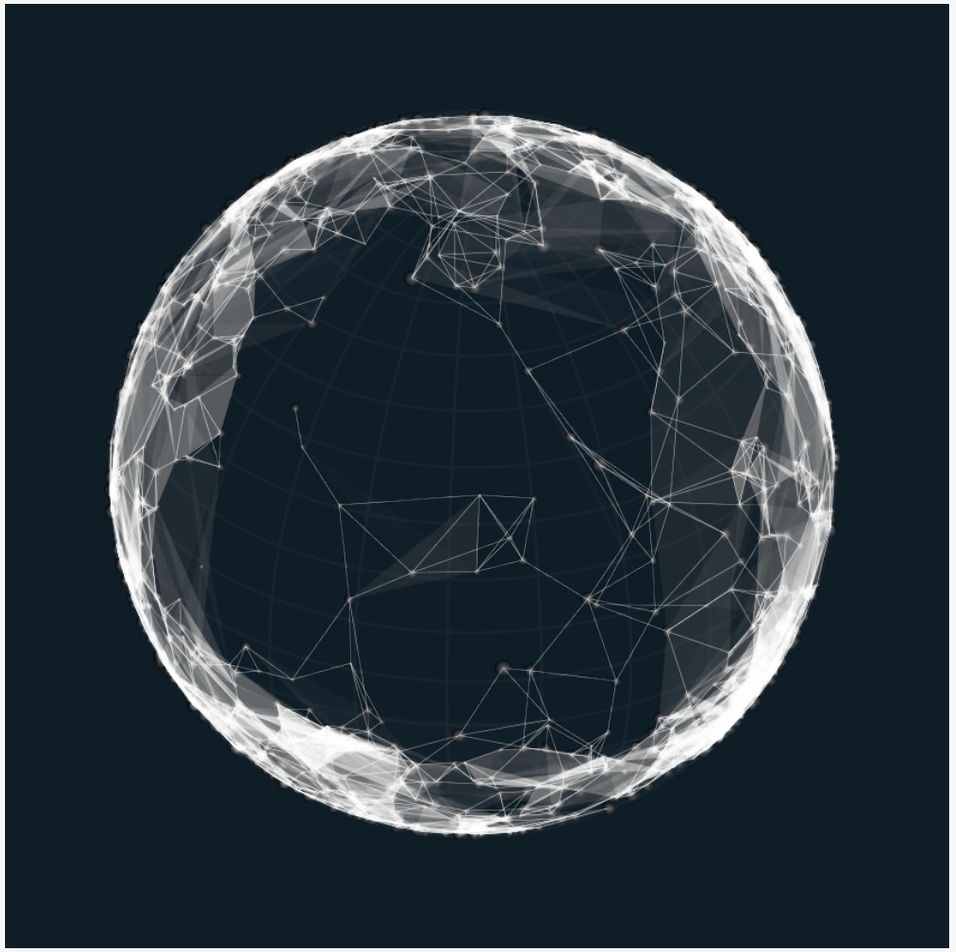
The one-way hash.

```
e3b0c44298fc1c149af
bf4c8996fb92427ae41
e4649b934ca495991b7
852b855
```

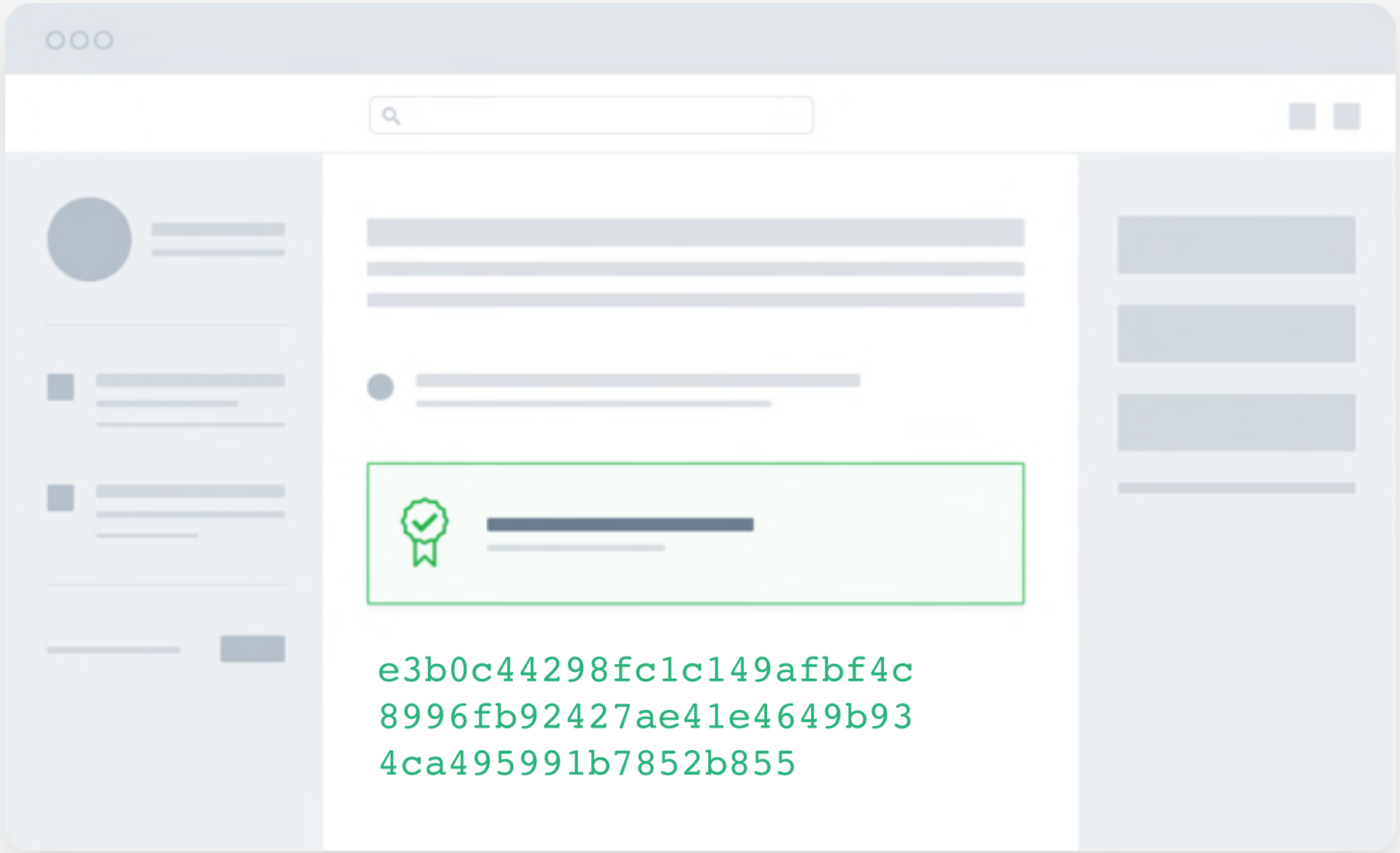


The one-way hash.
On the blockchain.

```
e3b0c44298fc1c149af
bf4c8996fb92427ae41
e4649b934ca495991b7
852b855
```



Verifiers generate local hash and compare to the one on the blockchain.

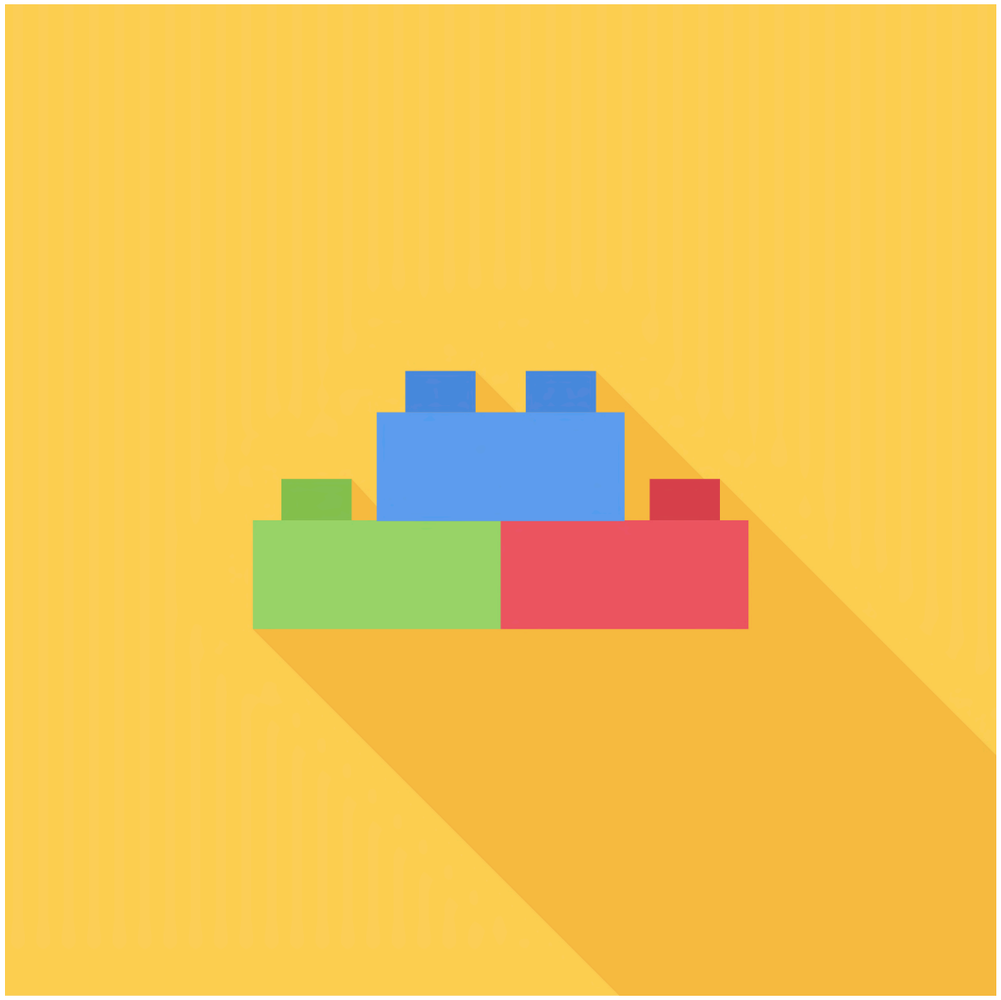


OPEN SOURCE

Blockcerts: the open standard.

Background

Incubated with MIT in 2016 and remains aligned with the W3C and other standards bodies for ongoing development.



Core Alignments

— IMS Open Badges V2

— W3C Merkle Proof Signature Suite

— W3C Verifiable Claims

— W3C Decentralized Identifiers

Extend

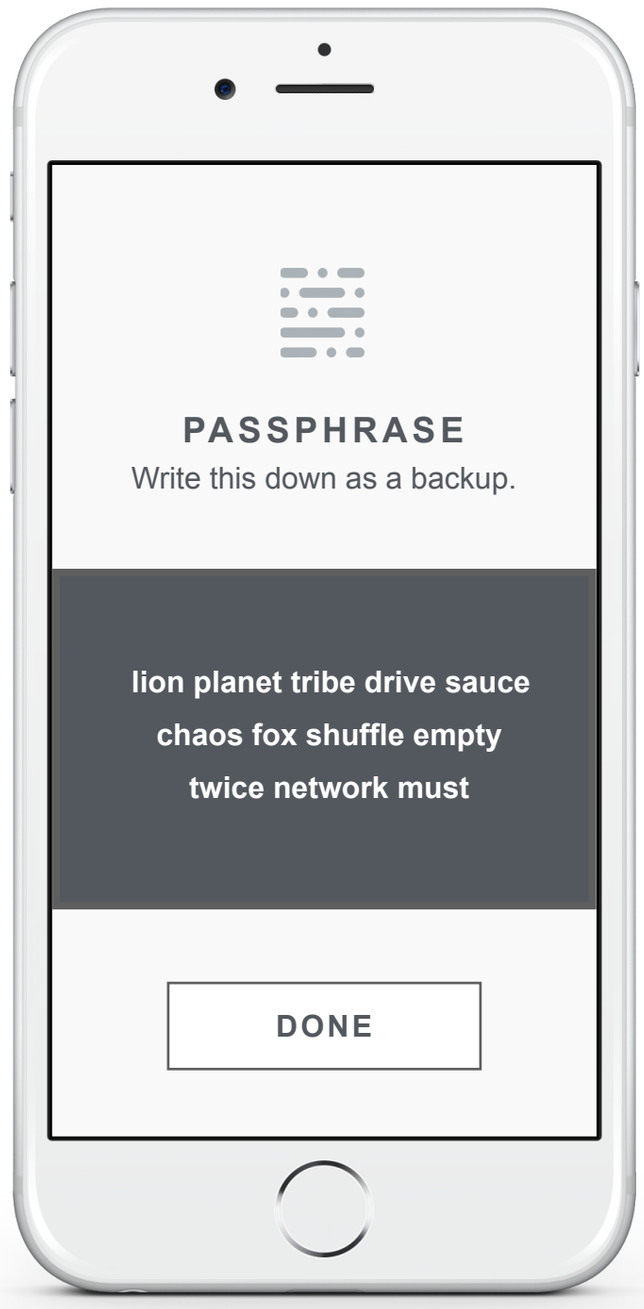
— JSON LD Schemas

Blockcerts mobile app.

Learner ownership

The mobile app is open source and free for recipients to use. It provides the most convenient way to generate cryptographic keys and hold digital records inscribed with those keys.

www.blockcerts.org



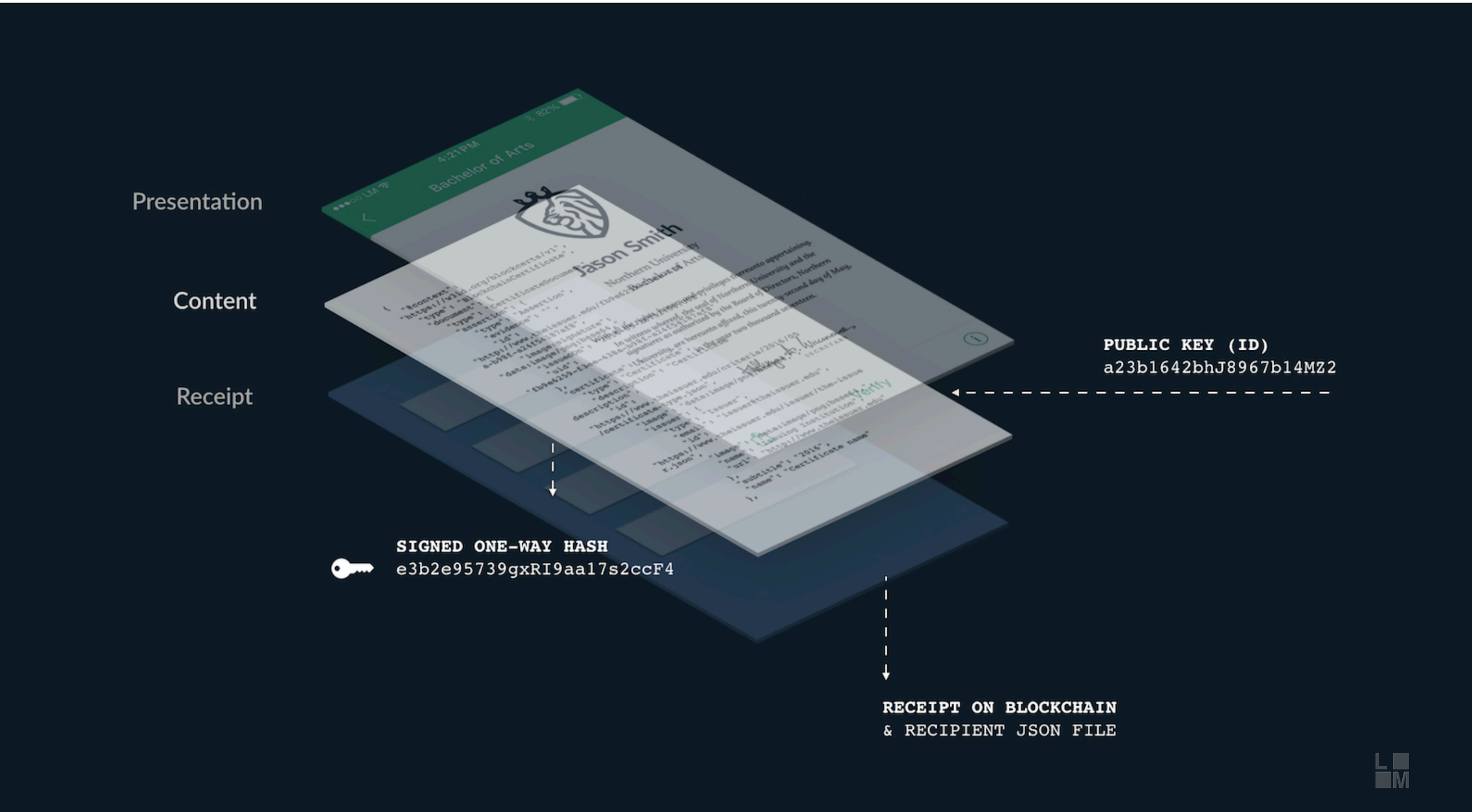
Private Key

Used to prove ownership

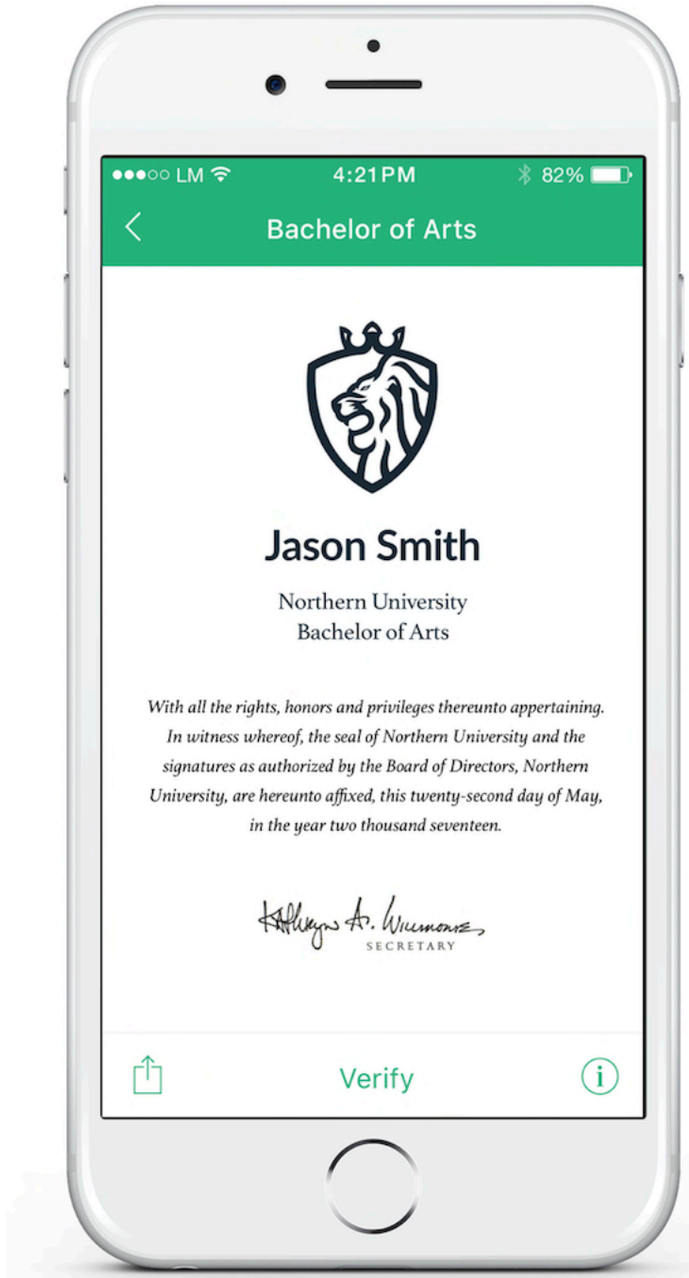
Public Key

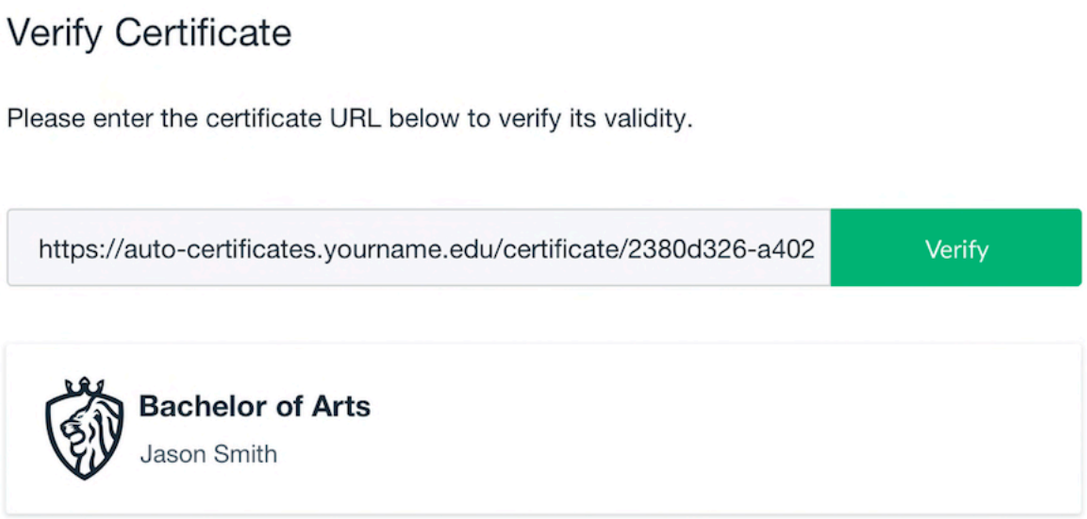
Sent to issuers for identity

Anatomy of a digital record.



Decentralized verification.



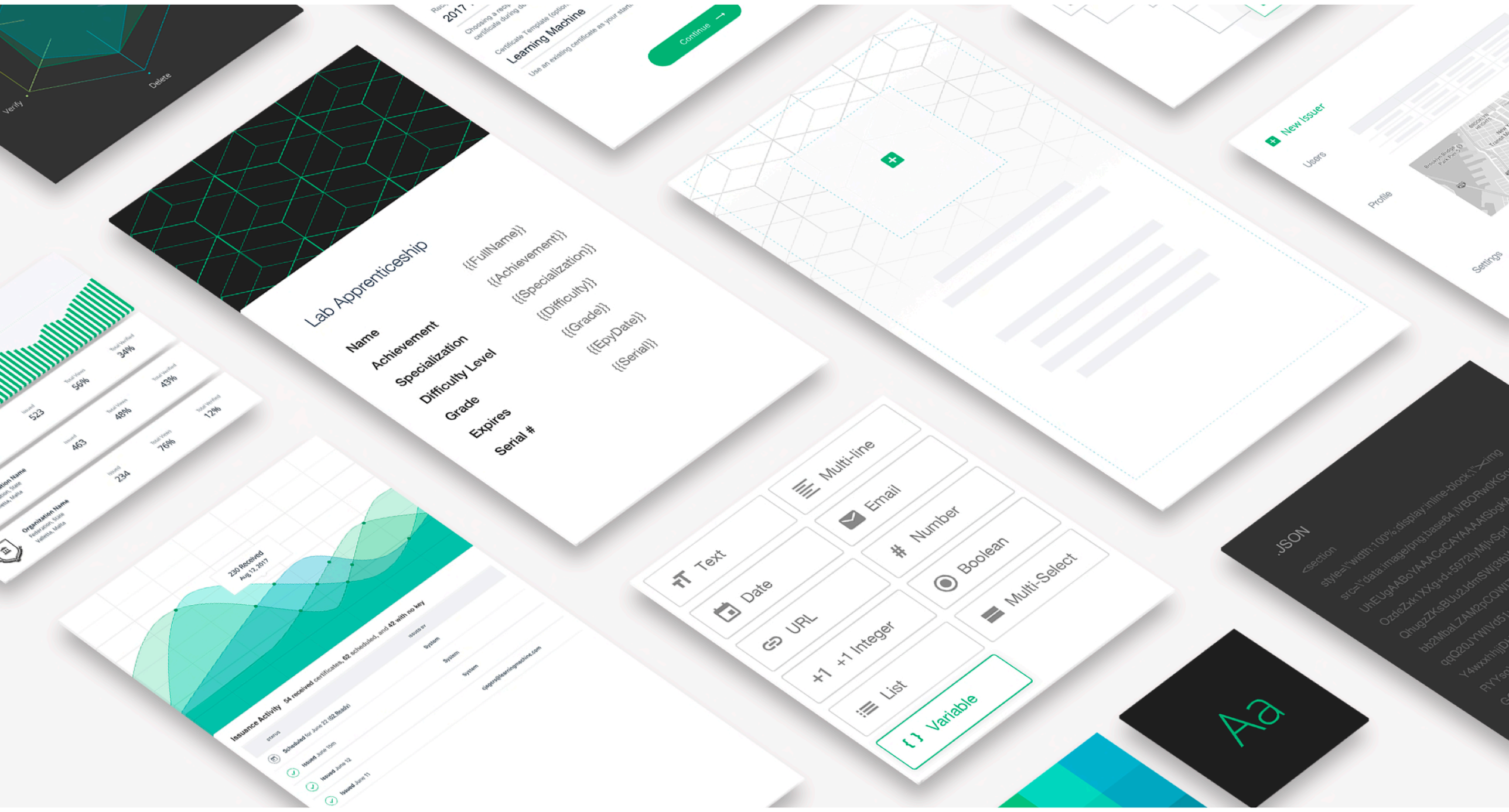


Independence from vendors and issuers.

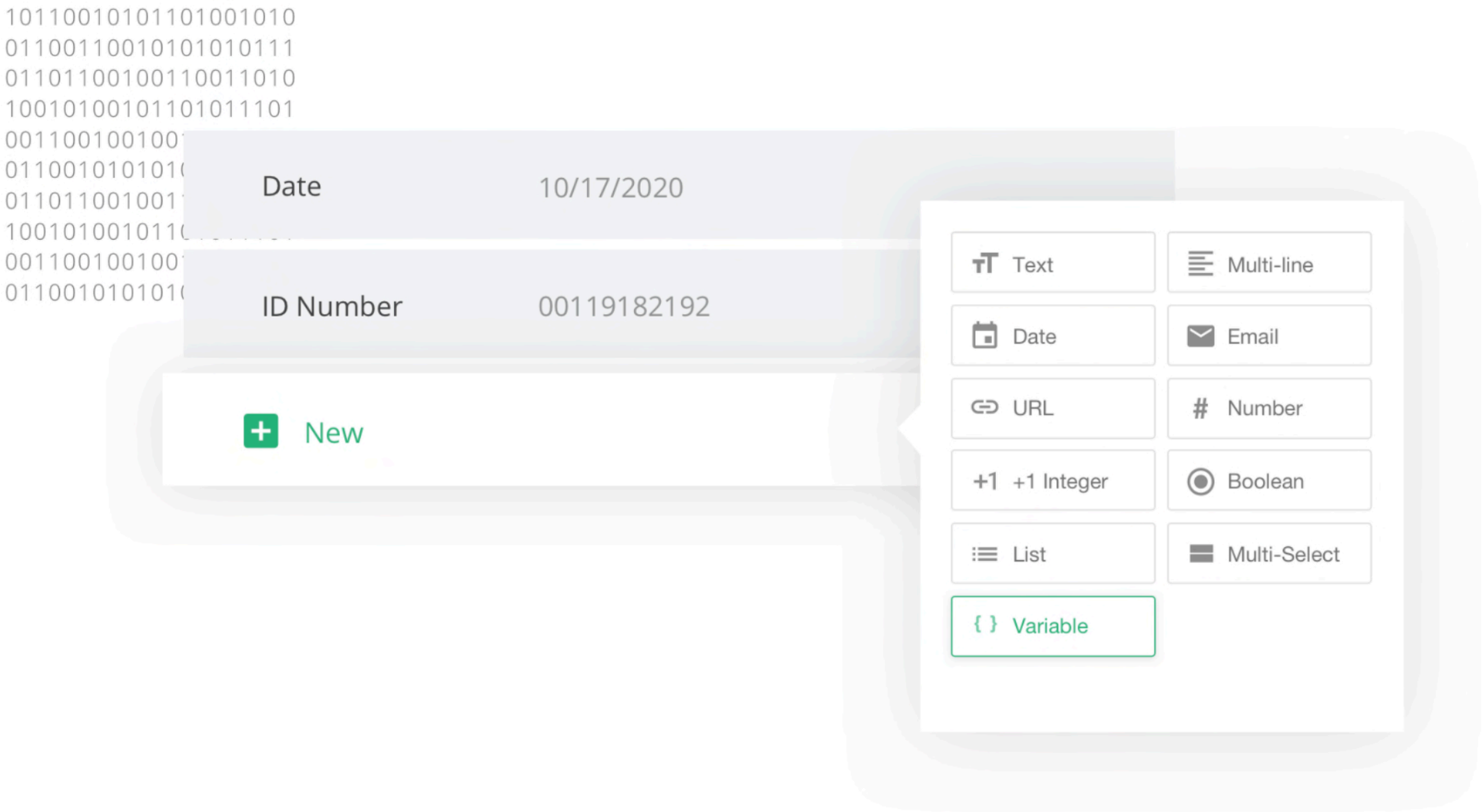
Chapter 2

Standards adoption depends on secure and convenient enterprise software.

Create, issue, and manage digital records.

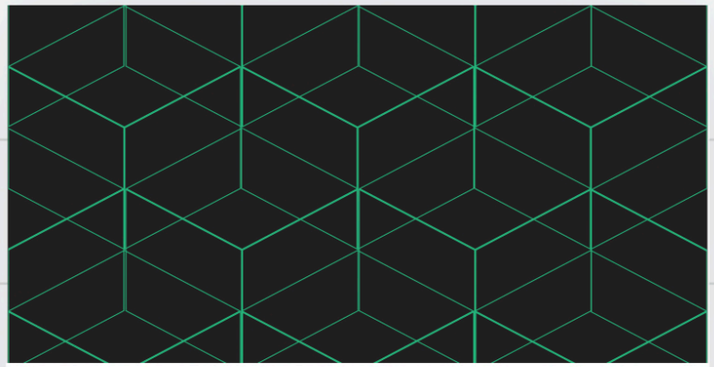


Make records smart.



Issue to entire cohorts.

Full Name	Achievement	Difficulty Level	Expires
Chris Jagers	Lab Apprenticeship	4	1/5/2020
Dan Hughes	Lab Apprenticeship	3	1/5/2020
Dimi Arhontidis	Lab Apprenticeship	4	1/5/2020
Chris Downie	Lab Apprenticeship	4	1/5/2020
Kim Duffy	Lab Apprenticeship	5	1/5/2020
Ted Wehner	Lab Apprenticeship	3	1/5/2020
Matthieu Colle	Lab Apprenticeship	5	1/5/2020

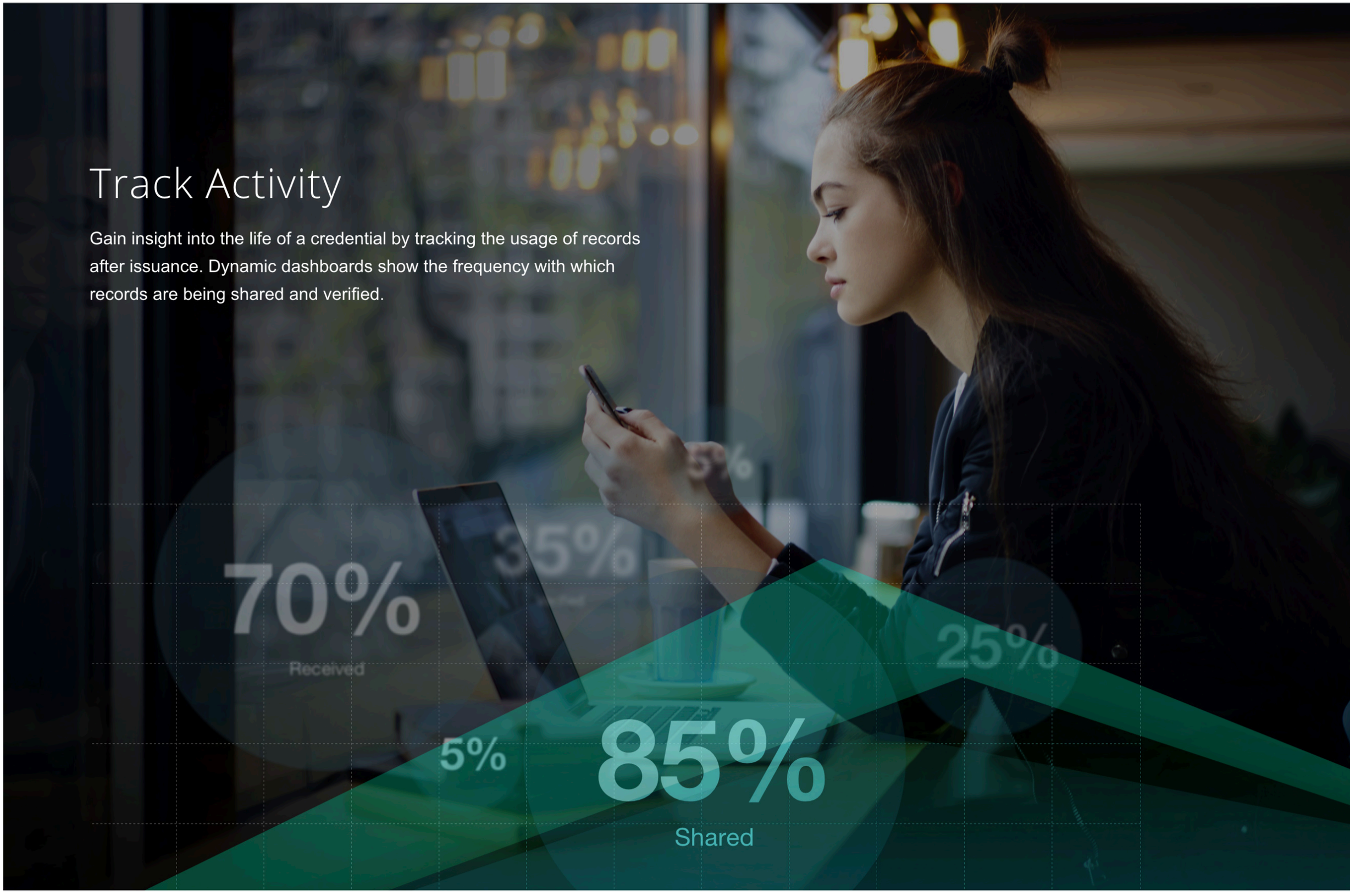


Lab Apprenticeship

Name	{{FullName}}
Achievement	{{Achievement}}
Specialization	{{Specialization}}
Difficulty Level	{{Difficulty}}
Grade	{{Grade}}
Expires	{{EpyDate}}
Serial #	{{Serial}}

Track Activity

Gain insight into the life of a credential by tracking the usage of records after issuance. Dynamic dashboards show the frequency with which records are being shared and verified.



Chapter 3

MIT issues digital diplomas

http://web.mit.edu/registrar/records/certs/digital_faqs.html

MIT REGISTRAR'S OFFICE

Transcripts
Degree Certifications
Enrollment Certifications
Loan Deferment Letters
Subject Registration Letters
Dean's Certifications
Apostille Certifications
Digital Diploma Pilot Program

Digital Diploma Pilot Program FAQs

If you are a current participant in the Digital Diploma Pilot Program, read on.

To verify a digital diploma from MIT, use our verification portal.

What are the benefits of having a digital diploma?

A digital diploma can be used to verify your degree to employers or other universities. It can also be shared with family and friends publicly on social media or privately via text or email. We believe that the full benefits of having a digital diploma will continue to evolve as this technology becomes more prevalent.

Does this mean that I won't get a physical diploma?

No. All graduates will receive a physical diploma, but we are now beginning to offer an official digital copy of that diploma as well.

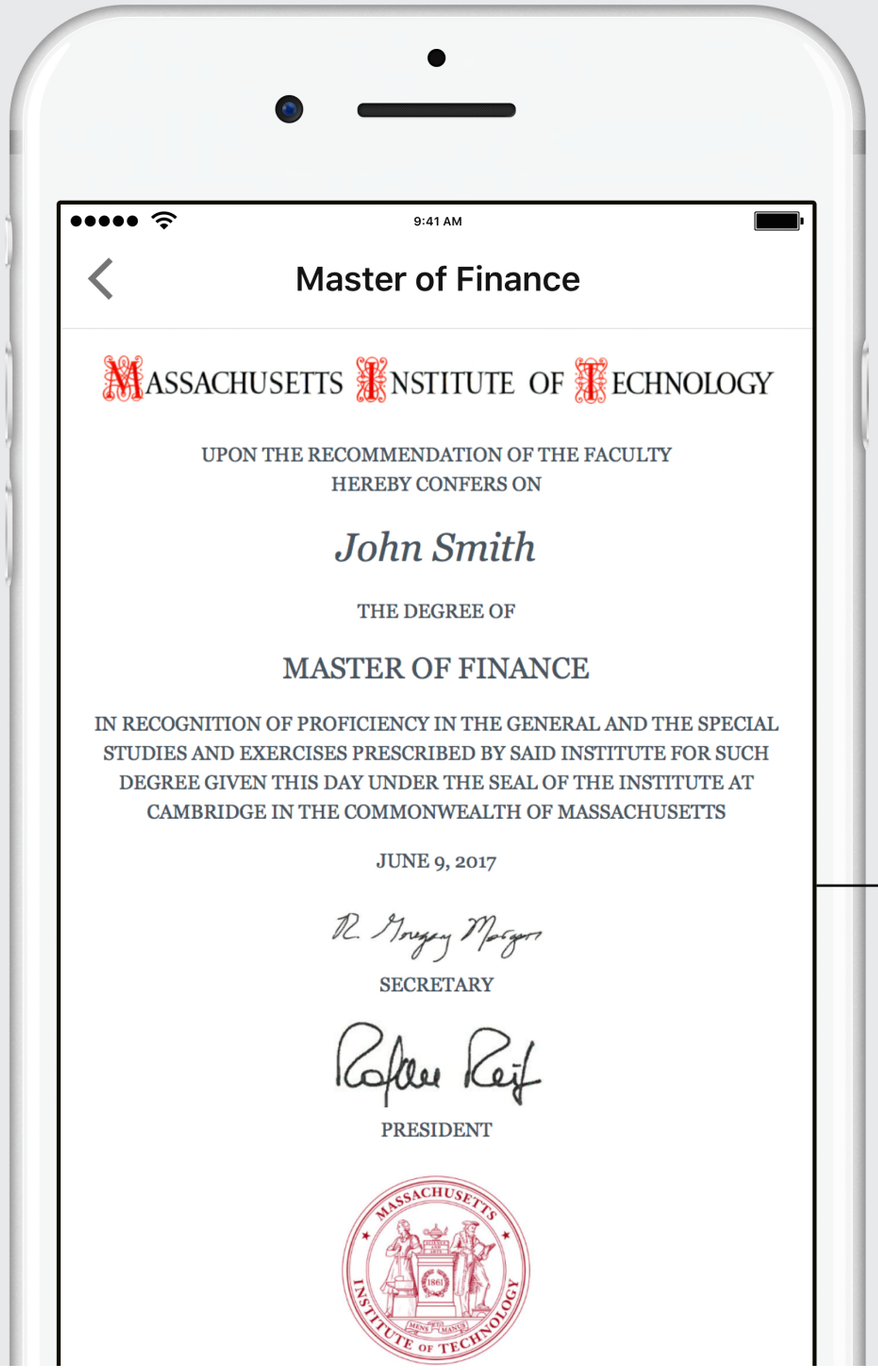
How does the digital diploma work?

MIT and its partner Learning Machine use the blockchain to protect and verify your diploma. This is the same technology that allows bitcoin to be decentralized and secure. Your coded diploma is sent to you by email as an attachment, so you can store it in a secure place of your choosing. You can also store and view your diploma in the mobile app.

How do I get my digital diploma?

Obtaining your digital diploma is an easy, three-step process:

Download the Blockcerts Wallet mobile app. Links for downloading the app will be provided in an email from MIT. Once you download the app, create an account. During this process, you will receive a passphrase. It is crucial that you store this passphrase somewhere safe (such as in a password manager), as is it not retrievable.



Step 1 of 5
Computing local hash [DONE]

Step 2 of 5
Fetching remote hash [DONE]

Step 3 of 5
Comparing local and remote hashes [DONE]

Step 4 of 5
Checking Merkle root [DONE]

Step 5 of 5
Checking receipt [DONE]

VERIFIED

Public Key
1HYPitzbwR83M3Smw6GWs5XeQzBWoJAEes

Blockchain Address
4bf64ff1517554dac3496e9da0a28ca9ae492682b0898e384ea17e7f90ee1295

Massachusetts Institute of Technology

MIT DEGREE VERIFICATION

Use this page to verify MIT degrees that have been registered on the blockchain. For questions, contact the Registrar's Office at records@mit.edu or (617) 253-2658.

Certificate URL

Verify

Or choose a file

You can also Drag & Drop your certificate JSON file

“From the beginning, one of our primary motivations has been to empower students to be the curators of their own credentials. This pilot makes it possible for them to have ownership of their records and be able to share them in a secure way, with whomever they choose.”

— MARY CALLAHAN, MIT REGISTRAR

Chapter 4

Cryptocurrencies make decentralized applications possible.

History of Compute

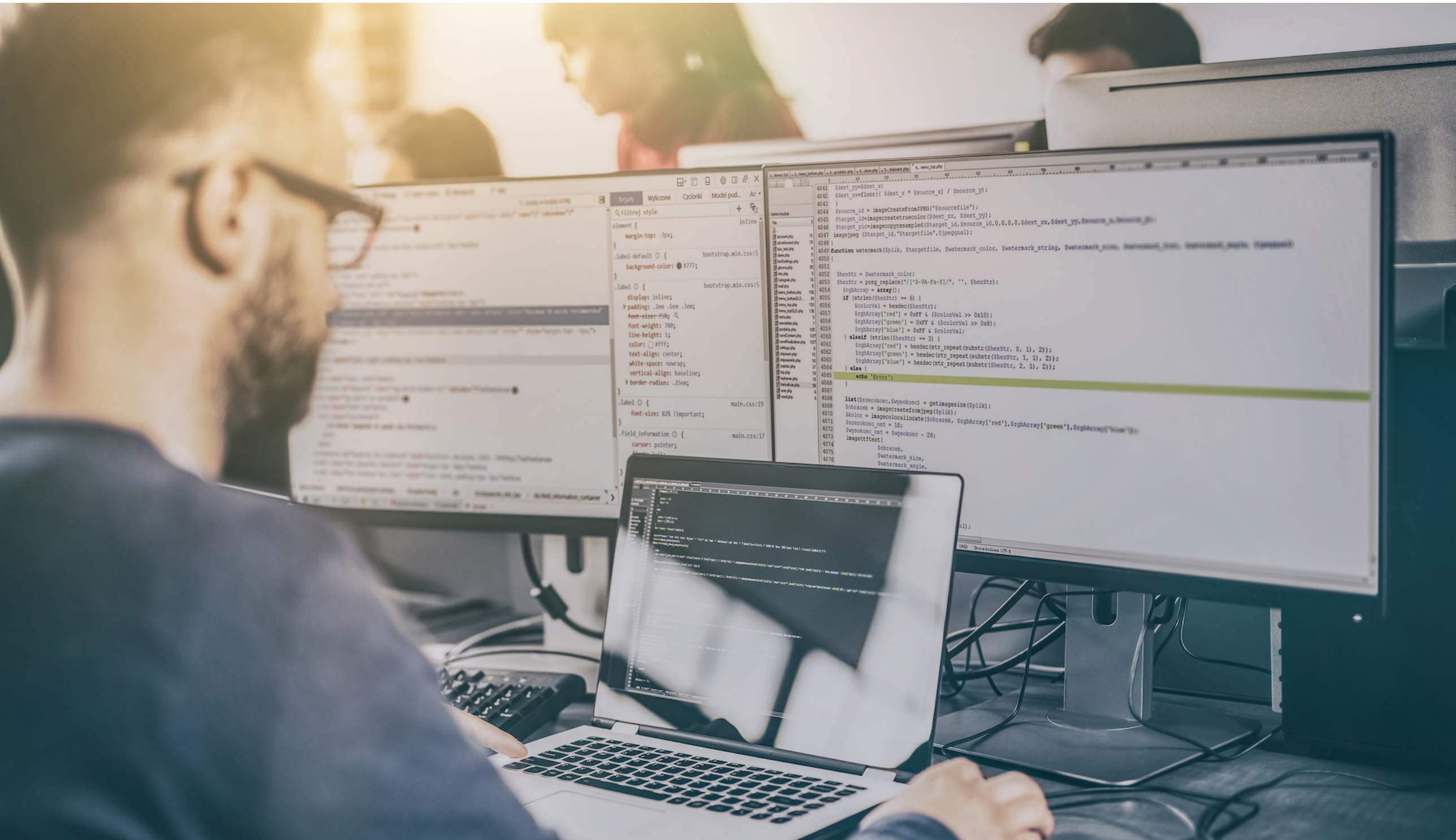
Electronic Computers
From mainframes to personal computers.

World Wide Web
Networked data and cloud based compute.

Mobile Devices
Mobility and real-time sensors enhance data.

Decentralized Apps
Decentralized networks run peer-to-peer apps.

Developers create the apps.

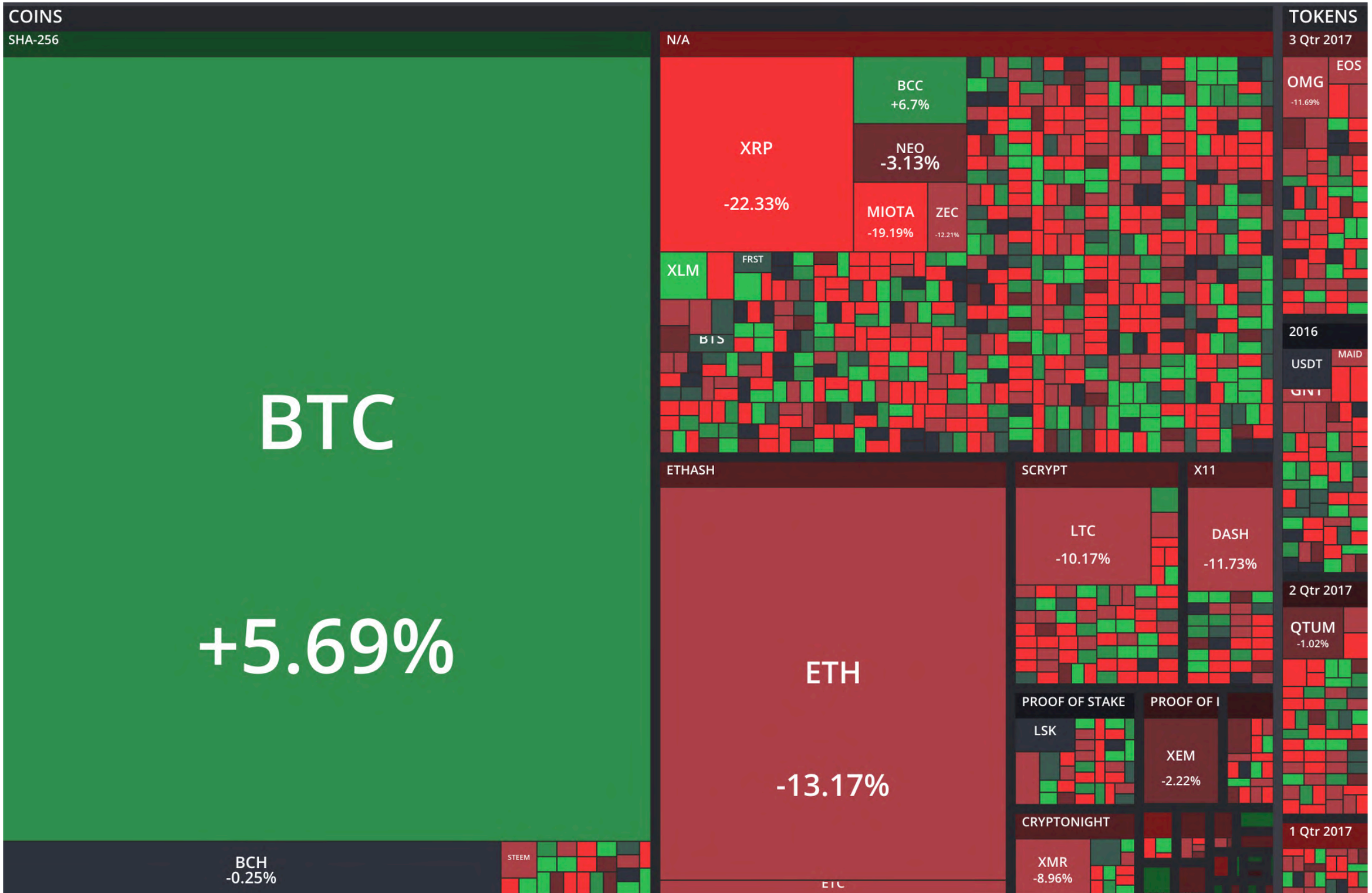


Decentralized networks run the apps.

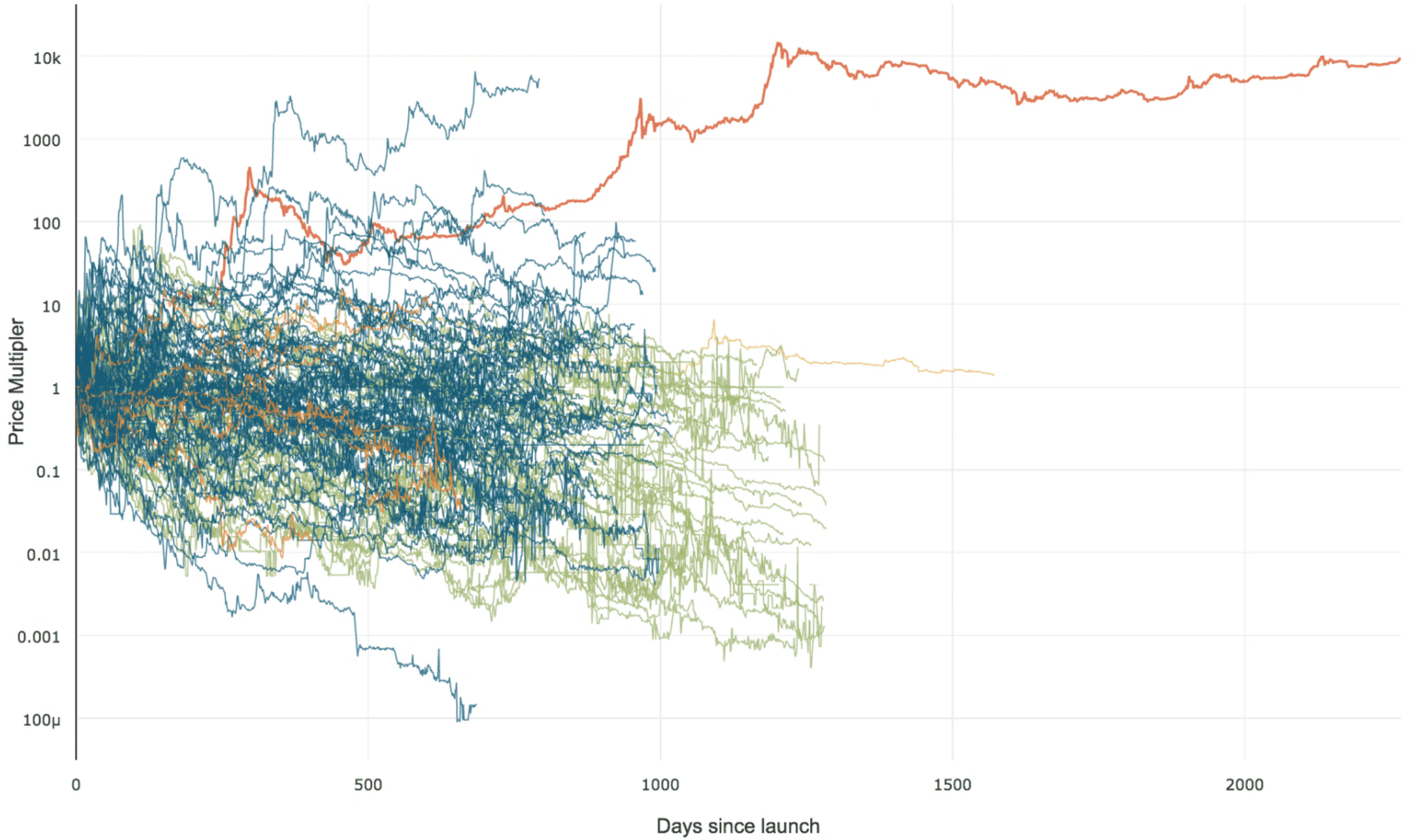
These networks are financially incentivized — coin.

A blockchain keeps a ledger of the coin.

The size of the network matters.



Most d-apps don’t last.



http://woobull.com/data-visualisation-118-coins-plotted-over-time-this-is-why-hodl-alt-coin-indexes-dont-work/

Thank you!

Open for questions.