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Blockchain Certificates

The Future of Academic Credentialing and Professional Certification.

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Learning Machine provides infrastructure software that enables organizations to issue and track official records by using the Bitcoin blockchain network as a notary.

Built especially for academic credentialing and professional certifications.

Digital Records
Designed for diplomas, transcripts, memberships, and certifications.

Cryptographic Signature
Sign certificates with your org's private key for later verification.

Convenient Issuance
Certificate batches are notarized by the public blockchain.

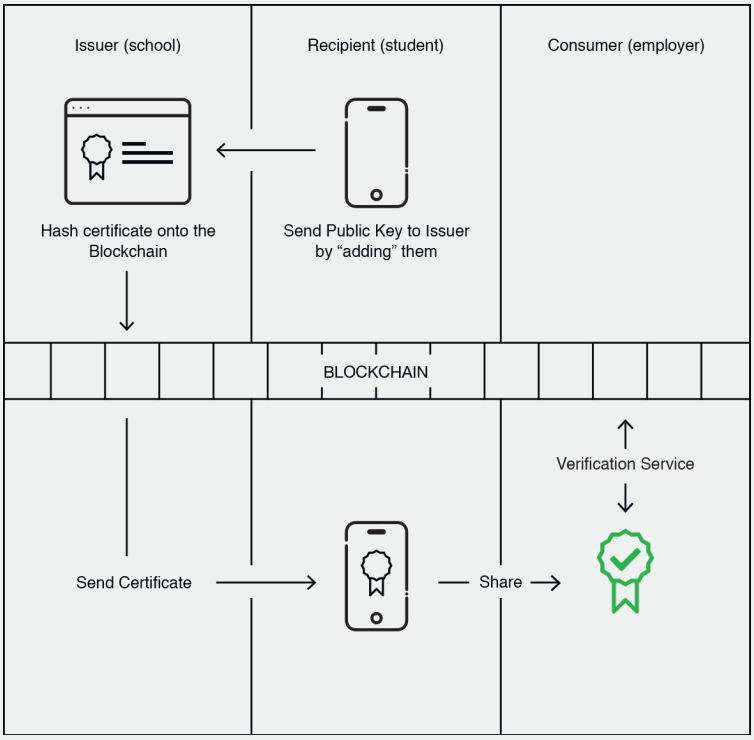
Mobile Vault
Recipients can receive and share certificates via our free mobile app.

Verifiable Credentials
Certificates can be shared and independently verified.

Data Analytics
Organizations receive analytics for how certificates are being used.

Data Integration
Connect other apps and continue building a unified contact record.

Scalability & Reliability
Enterprise architecture for high volume and high availability.



The blockchain is used as a notary to record and verify blockchain-based certificates.

Reimagine Official Records

The public blockchain allows the world to rethink how official records are created, held, and verified. Organizations can perform all of the same record keeping functions they do today, but instead of having to transmit official records on behalf of learners, records can now be given to learners so they can share records directly with third parties. Fraud is prevented by using the blockchain as a notary, which can independently verify the authenticity of records at any time.

The blockchain is a global ledger of transactions that stores an immutable history of events. In the case of a certificate, the blockchain records who issued it, who received it, and a hash of the content. All together, this creates cryptographic proof that cannot be faked.

Like any technology infrastructure, using the blockchain requires a purpose-built technology stack. Learning Machine is an enterprise-grade solution for utilizing the the public blockchain network. This decentralized network creates a secure anchor of trust that allows individuals to become their own lifelong registrars.

Rethink Your Systems

Learning Machine enables organizations to launch and connect to the public blockchain network for conferring official records of achievement or membership.

In order to ensure the longevity and interoperability of blockchain certificates, we began establishing an open standard called Blockcerts. Developed in partnership with MIT, that standard is comprised of an open source toolkit which can be used by any developer, vendor, or school system. This standard lays the foundation for convenient adoption across the ecosystem.

Learning Machine utilizes these open source components with commercial product that provides additional conveniences around permissions, approvals, design, analytics, and other necessary features for team operation.

More than a raw product, Learning Machine partners with organizations to help strategize, plan, design, pilot, and launch production systems that meet security, governance, and scalability demands.

Certificate Types & Attributes

The word certificate is being used generically as a symbol for any number of form factors. This includes diplomas, transcripts, course completion, badges, professional certifications—anything. A certificate is content agnostic and simply makes claims of achievement independently verifiable.

Issuing a batch of certificates is similar to an email campaign, in that individual variables can be merged into each certificate during a batch issuance. Simple certificates may only use the recipient's first name and last name. More complex documents, like a transcript, could merge in individual grades across subject areas.

Once a certificate has been issued, it cannot be edited by the issuer or the recipient. This is one of the blockchain's primary features. However, certificates may have expiration dates, and they can be revoked if necessary.

Anatomy of a Blockchain Certificate

Blockchain certificates are digital records, machine readable, and independently verifiable. The certificate is composed of three layers.

Presentation
This "friendly" display of the certificate may resemble traditional form factors. It can display your institution's logo, certificate title, recipient name, variable content, and additional images like seals and signatures that convey the historical marks of authenticity. The layout may vary depending on device, and it may contain a verification button for low-stakes situations.

Content
This layer contains the actual immutable content of a certificate in JSON format. Beyond text and images, this layer is also signed with your organization's private key, cryptographically ensuring that it was issued by you. A one-way hash of all this content is then stored on the final layer, called the receipt.

Receipt
The receipt contains all of the transaction details, which are checked as proof during verification. Just like the receipt from a store purchase, this layer contains all of the cryptographic details of the transaction:

- Hash of certificate
- Path to hash within Merkle tree
- Merkle root
- Transaction ID
- Anchors to the blockchain

Mobile App for Recipients

The lynchpin of the ecosystem is the Learning Machine mobile app for recipients. While it's possible to receive certificates without the mobile app, it would be very difficult. The app manages cryptographic keys in the background and helps to establish strong connections with issuing institutions.

The process begins with your organization giving leaners a link. This link is added to the app, along with the recipient's name and email address. Adding the link to a learner's app sends your organization their public key so you can begin issuing them certificates.

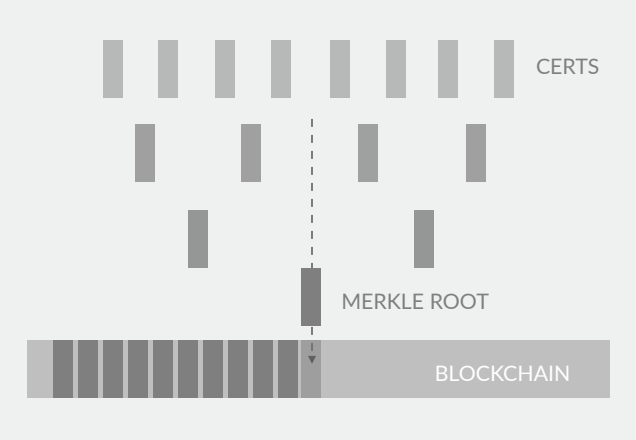
Once issued, certificates are organized by issuer. Recipients can view and share these records privately with a third party, publicly online, or through a variety of integration partners.

Verification for Employers and Others

While blockchain certificates may host their own verification buttons, that could potentially be spoofed. The best way to verify certificates is through an independent verification service. This is built into the HR/ATS systems of employers, certification bodies, and school systems that need to automatically verify claims.

If an employer does not yet have this service built into their software tools, they may also go to their branded verification site and paste the link of any certificate to verify its claim.

In both cases, the verification service is checking the transaction receipt created at the time of issuance.



Batch issuance occurs via a Merkle tree and creates the receipt.

Additional Benefits

We understand that new tools need to co-exist within a wider network of systems and vendors. That's why our integration engineers can help connect production workspaces with your larger ecosystem.

Further, we want to provide value beyond the issuing and tracking of certificates. That's why we've built a companion app for building a unified contact record. It easily connects to the apps you already use and passively pulls in contacts and activity data so you can watch each person's story emerge.

Profiles include your custom data fields, an activity log, and an automatic collection of certificates issued to that person. Aggregate views allow for building lists, geo-mapping, and data visualization that help you explore and understand your various populations.

Partner with Learning Machine

We're deeply invested in our partners and committed to their success long after the initial launch. The three initial phases of engagement include:

Educate
Time is scheduled to present the technology to your key stakeholders and answer any questions. This will help to determine institutional intent for moving forward.

Pilot
Plan, design, and configure a small production instance. This includes provisioning a private Amazon instance for hosting the application and an S3 instance for storing certificates. Included is the configuration of domains, SSO, user accounts, custom data schemas, and more.

Launch
Expand the number of issuing workspaces with the possibility of aggregate analytics. Provide ongoing training and support to ensure success.

About Learning Machine

Learning Machine is a technology company that works with governments, schools, businesses, and certification bodies to stand up new credentialing systems that leverage the power of the Bitcoin blockchain infrastructure.

Learning Machine and the MIT Media Lab incubated Blockcerts, the open standard for blockchain-based certificates: www.blockcerts.org

Learn more at www.learningmachine.com.

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