



**BLOCKCHAIN**



# Building Blockchain Solutions

Provide Authenticity and Trust  
to all information you create,  
process, store and distribute



# Digital Disruption Is Here

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The application of new digital technologies causes seismic upheavals in all markets: retail, services, healthcare, manufacturing and even public and non-profit organizations.

The exponential growth of technology in mobility, AI, wearables, video, cloud, analytics, and other digital technologies radically transforms the ways we live, work and play.

## The Agile Enterprise

To survive and thrive, the whole enterprise needs to embrace Agile in order to become capable of rapid response to change: to unexpected challenges, events, and opportunities. Agile IT encourages rapid and flexible response to change.

## APIs are the tools for agile innovation

You can use APIs to share data and information and to enable transactions in legacy applications.

APIs enable you to leverage your internal data, or third-party data, or algorithms to create new products, services and business models.

## Blockchain, the Big Disruptor

For the first time there is a technology that can add indisputable Proof of Authenticity to all the content we capture, store and share and to all the transactions we process.

Blockchain is the Big Disruptor, because we inherently can trust the information on a Blockchain. Therefore we no longer need intermediaries, which leads to endless possibilities.

***Blockchain is the Big Disruptor, because we can inherently trust the information on a Blockchain.***

***Therefore we no longer need middlemen, which leads to endless possibilities.***

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# A single version of the Truth

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Blockchain, best known as the underlying technology for Bitcoin, provides a Distributed Ledger mechanism to lock in information and making it independently verifiable and auditable.

For the first time there is a technology that can add indisputable Proof of Authenticity to all the content we create, store, process, share and distribute.

## **A single version of the truth**

Currently each participant in a transaction has his own separate, individual ledger and therefore his own version of the truth.

Which is why we need to rely on intermediaries to provide trust and consolidation, which is inefficient, error prone and fraud sensitive, and leads to disputes.

With Blockchain there is a single ledger, shared by each participant as the single version of the truth.

So, we now no longer need to rely on intermediaries, which is much more efficient, safer and cheaper.

## **Why is Blockchain called Revolutionary?**

Because we inherently can trust the information on a Blockchain, we no longer need intermediaries, the middlemen:

### *Banking without banks*

Money transfers, deposit remittances, investments, loans can all be executed and backed by Blockchain.

### *Insurance without insurance companies*

Communities can self-organize and use "smart contract" technology that will automatically collect fees, authorize claims and execute agreed payments.

### *Trade without letter of credits and consignments*

Stakeholders in supply chains can use "smart contract" technology to directly settle payments upon delivery.

And many more disruptions we cannot even imagine now.

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# Blockchain, How does it work?

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Blockchain is best described as a distributed and replicated database.

Typically, a traditional database is stored in a central location, somewhere on a networked server.

The database is managed by one or more database administrators.

Users must be authorized to use the database. User transactions store, change and read data in the central database.

By contrast Blockchain is a decentralized database that is replicated on thousands of computers globally through the use of a peer-to-peer network.

A user-transaction added to the Blockchain database is replicated to all nodes in the network. The network uses a mathematical consensus mechanism to validate and approve each transaction.

Only after validation and consensus the transaction is committed to the database.

This database can typically be accessed by anyone (public blockchain) or anyone with a permission to access the database (permissioned blockchain).

## Key concepts of Blockchain

### *Distributed ledger*

A ledger is shared over many nodes in a peer-to-peer network. Transactions are hashed and then replicated in all the shared ledgers.

### *Hashing*

Any generic data set (a value, a file, a database, the status of a transaction, etc.) can be hashed to produce a short unique identifier, an electronic fingerprint, called a hash.

### *Consensus*

All transactions are validated through a consensus mechanism before they are committed. Different Blockchain systems can have different consensus mechanisms.

### *Public, Private or Permissioned Blockchain*

A *Public* ledger can be used by anyone. By contrast a *Private* ledger is maintained and accessed by a single organization.

A *Permissioned* ledger is distributed, shared and used by multiple but specifically authorized users.

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# Blockchain: What can I do with it?

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## Certify and authenticate content

The Sphereon Blockchain can create a unique electronic fingerprint (hash) for any document, object or data in Alfresco and anchor this on a Blockchain.

Anyone that has access to this object can now verify the authenticity by simply recreating the hash and verify it on the Blockchain.

When the object is unchanged, the hash will still be the same and is found on the Blockchain, including the timestamp of registration.

## Create independently verifiable audit trails

You can register steps in a workflow on a Blockchain.

Each registration is linked to a specific case, document and action, creating a chain of transactions: an audit-able trail.

This audit trail can then be verified by (authorized) third parties, providing Transparency, Compliance and -- most importantly -- Trust.

## Create a better Electronic Signature solution

Use Blockchain to sign *any* digital object, not just PDFs, with a legally binding Digital Signature.

Without the need for a central Certificate Authority or central Time-stamping server.

The Digital Signature also lives independent of the object which enables parallel signing and independent verification, with or without the object itself.

## Interact with Smart Contracts

The Sphereon Blockchain API can also interact with so-called Smart Contract applications .

This allows you to provide input required to execute a Smart Contract directly from within your applications.

***Blockchain – For the first time ever there now is a technology that adds indisputable Authenticity and Trust to all content we create, store, process, share and distribute.***

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# Sphereon, an API-driven cloud platform

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Sphereon offers an innovative platform that allows your organization to use APIs for Information Management, Document Processing and Blockchain.

## Easy integration

We provide standard integration plug-ins for Alfresco, MS SharePoint and Office 365, making it very easy to integrate Sphereon, without the need of low level programming.

## A broad range of intelligent APIs

Sphereon offers many smart APIs to extend and enhance the applications and solutions that you build for your business and for your customers. We offer APIs that unlock information stored in legacy ECM systems, Enterprise File Shares and Document Stores.

Also APIs that capture and extract data from objects, such as emails, photos, images, and documents.

Several of these APIs use Artificial Intelligence, for example to analyze or classify data objects, photos and documents.

## Sphereon Blockchain APIs

Or use our Blockchain APIs to digitally sign emails, objects and documents.

Or to log transactions, data or objects as immutable and independent verifiable records.

- **Blockchain Proof API**

A high-level API to prove, or disprove, the existence of any digital content at a certain point in time.

- **Easy Blockchain API**

Provides a blockchain agnostic solution to create and manage interlinking Blockchain data structures.

- **Crypto Keys API**

To create, import, and manage Secrets, Keys and Certificates. The API includes integration with MS Azure KeyVault.

*Online Developer Documentation on all our Blockchain APIs can be found on the [Sphereon.com website](https://www.sphereon.com)* 

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# Using Blockchain to Sign and Verify Documents

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## ***Use our Blockchain Proof API to 'sign' an object.***

Our Blockchain Proof API creates a unique electronic fingerprint (a hash), using a standard hashing algorithm as the identifier of your object.

Using our Crypto Keys API we also sign the transaction using a cryptographic key to guarantee the authenticity of the party that performed the transaction.

The transaction then gets registered into the Blockchain ledger. With this, the transaction gets timestamped as well.

It is important to know that the object itself will not be stored in a Blockchain, just the hash.

## **Verification**

Using a secure and trusted verification site, or our Blockchain Proof API, an object can now be verified.

The unique electronic fingerprint is created again and verified against the Blockchain.

If there is a match (there should be a match), the API returns a valid match as well as the original time-stamp.

If not, the document is not identical: it has been changed and should not be trusted implicitly.

## ***Blockchain Agnostic***

Our Blockchain APIs are not linked to one specific Blockchain infrastructure. We support multiple public and permissioned Blockchains with a set of generic APIs.

For example, we support Bitcoin (using the Factom API set), Ethereum, Hyperledger Fabric, Multichain and others.

We have build a generic API set around these different Blockchains, hiding the complexities of their low-level APIs and things like wallets and coins.

This provides easy access to these often very complex technologies, as well as flexibility to switch, link or adopt new blockchain technologies as they become available.

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# A better Digital Signature

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## Electronic Signatures

There are several Electronic Signature solutions available on the market today. These solutions allow you to add legally binding signatures to documents.

They also offer the functionality to enable external parties to sign documents.

But this technology also has several disadvantages.

## Disadvantages

First of all, these traditional signatures can only be added to PDF documents. Only the PDF format offers support for storing the signed certificates.

You will need to get an expensive certificate from only a limited group of Adobe approved *central* Certification Authorities (CA).

Besides this dependency on a central CA, you are also dependent on a central Time-stamping server.

Another drawback is that the digital signature is stored *inside* the document. This means that whoever needs to check if a document is signed, will have full read access to all the content in the document.

Also, because the document changes with each signature, signing documents in parallel is not possible: everybody needs to sign the document sequentially.

## Create better Electronic Signature solutions

Our eSignum API offers the same functionality and the same legal basis, plus we add important functionalities to create much better solutions.

## Sign any digital object

First of all, we support Digital Signatures for any type of digital object, not just PDF and office documents, but also drawings, pictures, videos, audio, or just data.

## Additional information on Blockchain

We also enable you to add additional information to the transaction on Blockchain, for example who signed or a status or any other value.

## Independent verification

With the registration on a Blockchain, the Digital Signature also lives independently of the object, which enables independent verification, with or without the necessity of having access to the object itself.

## Parallel signing of documents

Since the object is not changed by the signature, it also enables you to sign documents in parallel and implement business rules based on mandates, 4-eyes, majority vote, seniority, etc.

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# Using Blockchain for Compliance and Risk, Transparency and Trust

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## Compliance and Risk solutions

For most businesses specific rules and regulations exist that must be adhered to: internal as well as external rules dictated by governments and regulatory bodies.

## Create independently verifiable audit trails

Using our Blockchain API you can register each step in a process on a Blockchain.

Each registration is linked to a specific case, object, version and action, creating a chain of transactions: an independently verifiable audit trail.

## Create Trust

As this audit trail can then be verified by (authorized) third parties, this provides a high level of transparency.

Internal- and external controllers, stakeholders and regulatory bodies can easily verify Compliance, which -- most importantly -- results in Trust.

## *Interlinking Blockchains, Chains and Entries*

To create these audit-trails Sphereon creates data-structures by interlinking multiple chains and entries.

Our Blockchain API enables you to build a kind of virtual Blockchain by enabling you to interlink different Blockchains into a data structure.

We enable you to programmatically determine the Chain ID of the Chain you want to link to. The same goes for the Entry ID.

What's more, these Chains or Entries can exist in a different Blockchain or even a different Blockchain infrastructure.

This enables you to link between different Public, Private or Permissioned Blockchains and build data structures across multiple Blockchains.

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# Using Blockchain for Smart Contracts

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Smart Contracts are *self-verifying* and *self-executing*, computerized transaction protocols, stored on a Blockchain, that perform the terms of a contract. Put very simply, Smart Contracts are a piece of program-code on a Blockchain.

What makes Smart Contracts special is that they are uniquely tamper proof.

When they are executed, these Smart Contracts run on node networks, which nobody controls, nobody can tamper with, and therefore everyone can trust.

This assures all participants that the contract will be executed as it was written.

Unchangeable. Impossible to influence.

You can create these kinds of applications yourself using public tools, such as Solidity for Ethereum.

Then, use our Blockchain API, or any of the other APIs we provide, to exchange data with the Smart Contract.

## **Self-verifying**

Means that a Smart Contract performs its own evaluation and keeps a provable recording that a contractual performance has occurred: it records the performance of various pre-defined data feeds as defined in the Smart Contract.

## **Self-executing**

This means that the Smart Contract is executed once the preset conditions have been met.

*For example, software-use licenses typically require periodic payments.*

*If a user fails to make the license payments on time, the smart contract revokes the license rights and simply prevents access to the software.*

# Co-creation in a Partner Ecosystem

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## Change is not a constant, change is exponential

We live in a time of exponential growth of technology as described by Moravec, Vinge, Kurzweil and others.

Organizations will need to participate in ecosystems of networked vendors, partners, contract workers, as well as customers, that work together in order to thrive in today's fast-moving, hyper-connected world. We need to work together and co-create new products, services and business models faster and smarter.

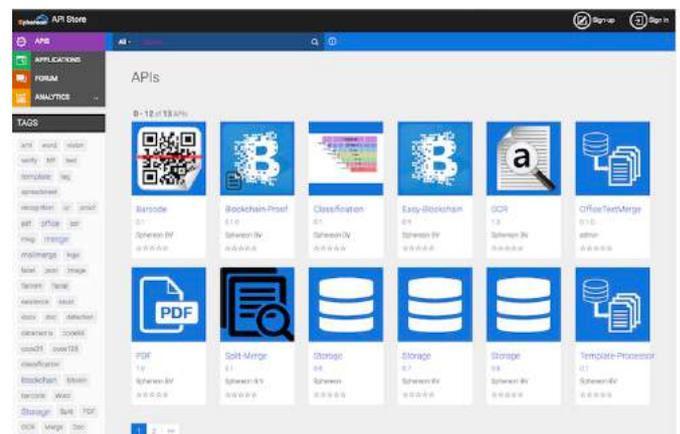
## We need to create real partnerships

The best partners have a deep, industry-specific, expertise across technologies and markets, creating the crucial ability to provide not only IT solutions and services, but also business knowledge. Each partner will benefit from the "network effect" of the other organizations' knowledge, experience and efforts.

Sphereon is actively looking for such partnerships to co-create solutions for tomorrow today.

[store.sphereon.com](https://store.sphereon.com)

Our APIs are public and published in our API Store.



All our APIs are accompanied by extensive online documentation, live-try-outs, sample-code and SDKs for all modern programming languages like Java, C#, PHP, Python, and many more.

[Online Developer Documentation](#) on all our Blockchain APIs can be found on the [Sphereon.com website](#)

**APIs are essential to Blockchain.  
They are the building blocks for  
all Blockchain solutions.**

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# About Sphereon

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Sphereon is an innovative software company, often ahead of the curve, based in The Netherlands.

Sphereon was founded in 2015 by experienced industry veterans and a young CEO, with a mission to develop the Sphereon platform.

Sphereon provides an API-driven cloud platform for Document Processing and Blockchain.

The Sphereon platform is built using modern Micro-services technologies, while the functionality is based on our industry experience and the input and feedback from our partners and customers.

APIs are a crucial building-block in today's API economy. Where it is all about agility and co-creation is the name of the game. Adapt or Die.

This API-first, Cloud-first, approach allows us to offer our customers a very close integration with their projects and quickly adapt to their ever-changing needs.

*It is our mission to help you quickly build powerful and flexible solutions that are relevant to your business.  
Adopt, Adapt, Improve.*

Our success is a result of the solutions that we build together with you, our customers. We provide the software platform and you have the knowledge and experience in your market domains.



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