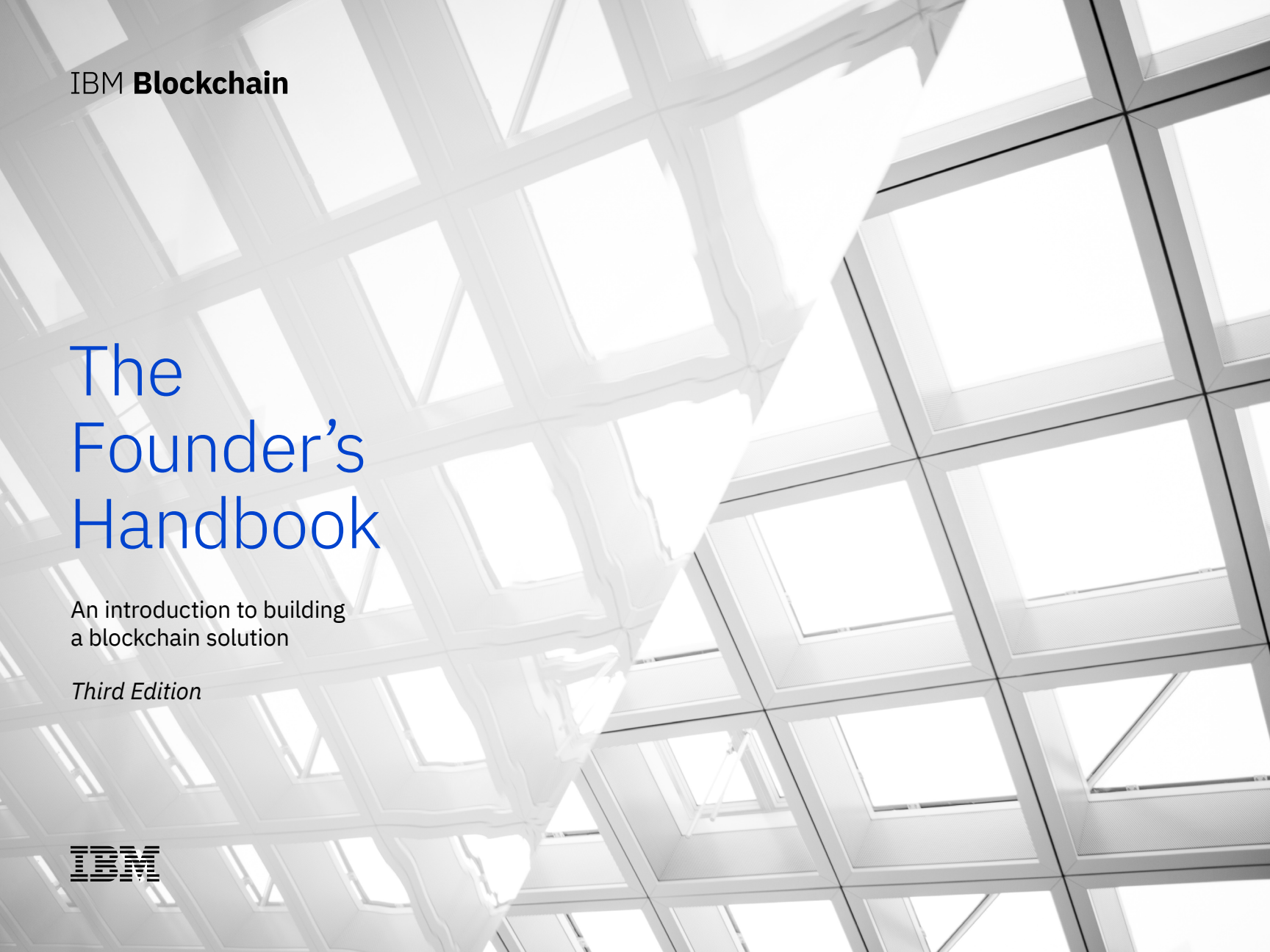
IBM **Blockchain**

The Founder's Handbook

An introduction to building a blockchain solution

Third Edition



The Founder's Handbook

Introduction

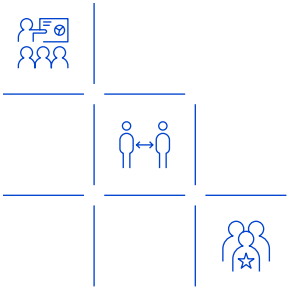
IBM Blockchain is more than technology. It's a movement to help you redefine your most important business relationships through trust, transparency and newfound collaboration.

Welcome, and thank you for downloading *The Founder's Handbook*. You're here because you might have a problem that blockchain can help you solve, and we want to give you the knowledge and tools to get started toward success. The following chapters will help you identify your blockchain use case, learn how to mobilize your ecosystem and navigate a governance model that provides both the necessary controls and flexibility for the growth of your ecosystem. This handbook also includes information on defining and managing smart contracts in a multiparty system, digitizing assets, legal considerations and new real-world examples.

Blockchain for business is a team effort.

Before we begin, there's one thought that should guide everything you do moving forward: blockchain for business is a team effort. Each organization, or party, can reap its benefits only by engaging across an ecosystem of multiple parties—all of whom derive some benefit. So, if blockchain for business is about more than one party, the first question you might ask is: Why call this document *The Founder's Handbook*? The answer is simple. Someone has to get the group started—namely, its founders.

A founder drives the creation and ongoing maintenance of a blockchain network. He or she can be a person or people within an organization. Founders can also be an organization or association of organizations. While all members derive value from the network, founders have the unique opportunity to lead the definition of how that value is provided and how all current and potential future participants derive value and recognize participation benefits. If that concept sounds like something you're interested in, then this handbook is for you.



Founder's tip →

There are three fundamental pieces of advice from our blockchain experience to consider as you go forward:

1. Dream big—and act incrementally.
Have a plan—a North Star of sorts—to guide you as you use the transformative power of blockchain. However, start with the minimum viable product (MVP) and minimum viable ecosystem (MVE) that will serve as your first steps along the way.

2. Motivation drives momentum.
Understand how to incentivize members of the network so that they're willing to balance their obligations and rewards.

3. The total of blockchain participation is greater than the sum of its parts.
Have the ability to bring the group together and convene under a common set of objectives while allowing respective organizations, or members, to explore their own goals from a new collaboration model. Remember, blockchain for business is a team effort.

Enterprise blockchain emerged from the dawn of cryptocurrency like bitcoin, but it's become more than a currency technology. The real long-term potential of blockchain lies in its ability to help organizations:

– Exploit the immutability and provenance of shared data.
– Transact data broadly with one another.
– Retain privacy and security for data.

By the way, when we talk about blockchain, unless stated otherwise, we refer exclusively to permissioned blockchain. And don't worry if you're new to blockchain, there are excellent resources to help bring you up to speed here.

Review resources here

Blockchain for business is transforming many of the world's most fundamental business processes. It's opening the door to new styles of digital interactions that vastly reduce the cost and complexity of getting things done.

Businesses traditionally re-evaluate status quo approaches and processes to capitalize on new advantages or overcome mounting obstacles out of necessity. To address current unforeseen

After you've finished reading this handbook, we'd love to hear your feedback through this short survey.

challenges and be better prepared for future ones, businesses have and will test status quo processes against innovative and potentially more effective approaches. Trusted, timely and precise information under privacy controls will prove paramount for businesses. And assessing the value of new approaches in governing multiparty information exchange will prove essential in addressing these challenges.

At IBM, we've worked with Hyperledger, an open source project hosted by The Linux Foundation, to reimagine blockchain from the ground up. It's why technical innovators turn to the IBM® Blockchain Platform. The IBM Blockchain Platform is optimized for Red Hat® OpenShift®, but thanks to Kubernetes-based architecture,it's the leading Hyperledger Fabric platform to build, operate, govern and grow blockchain solutions across virtually any computing environment. In other words, we've created a new breed of blockchain suitable for business use across industries and the regulatory environments they operate in.

With thousands of global engagements and hundreds of active networks, we've helped our clients learn what it takes to go from a good idea on paper to a value-producing blockchain network.

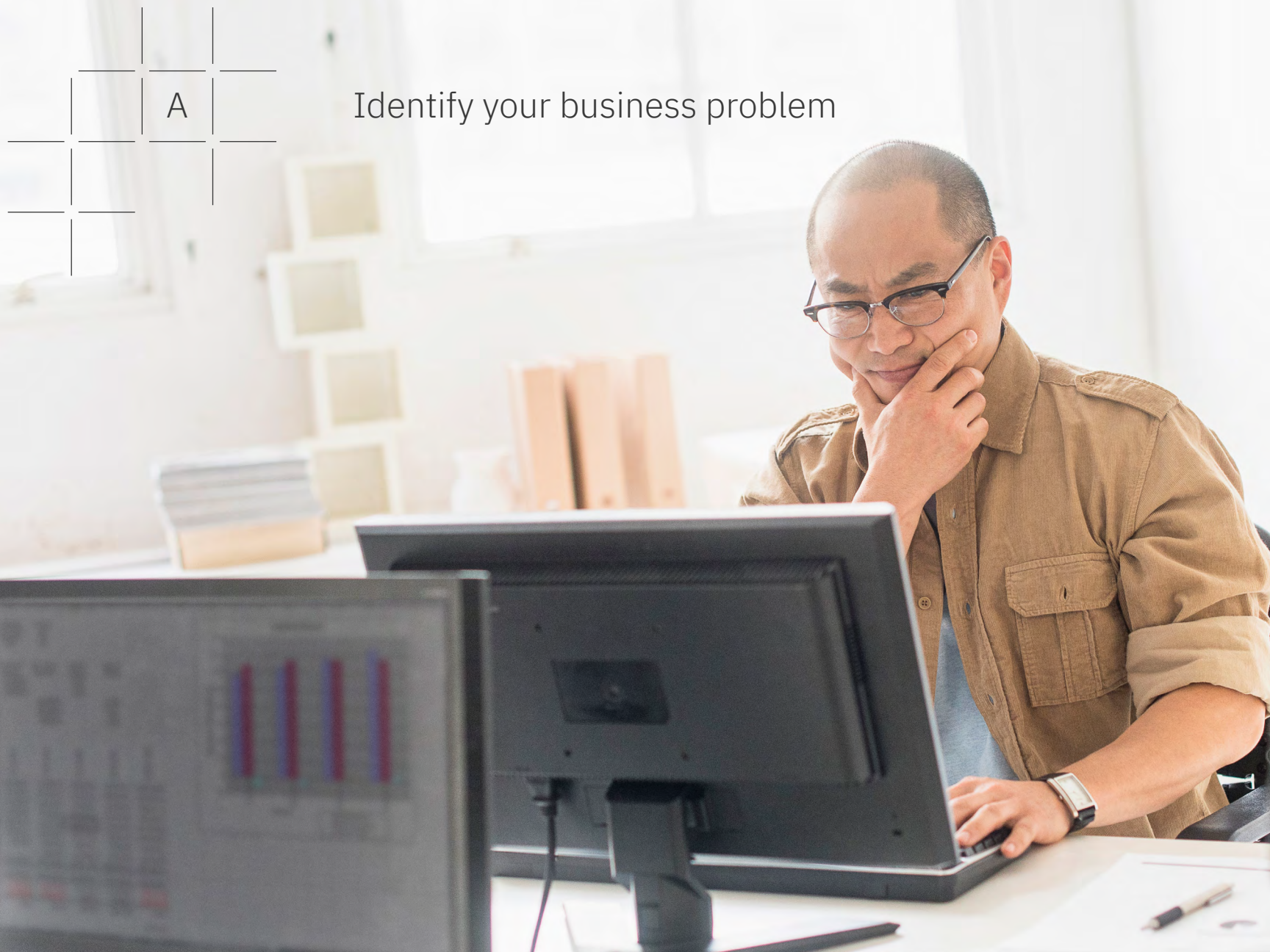
We've built the IBM Blockchain Platform to serve as the catalyst for creating your blockchain solution. What's more, we've also brought together IBM Blockchain and IBM Cloud® experts to help you apply best practices as you design, develop and deploy a blockchain solution. Our worldwide IBM Blockchain Services team has specific skills to assist you; they drive transformative business outcomes by applying the right expertise and proven methodologies wherever you are on your blockchain journey. To help make your founding a blockchain network journey easier, we've chronicled some of these best practices and outcomes in this founder's handbook.

The world has seen only the tip of the iceberg when it comes to blockchain for business; there are untold opportunities for more value and more use cases that could change the face of every industry—including yours. Quite simply, we believe that blockchain will do for business what the internet did for communication, and there has never been a better time to use this rapidly maturing technology.

What will we solve together? Let's find out.

A

Identify your business problem



A

Identify your business problem

"We found a use case that was a real problem. It wasn't a 'hey I could use blockchain for this'—it was a real problem that had to get solved—where the best technology for the problem was blockchain."

— **Greg Wolfond**, Founder, CEO and Chairman, SecureKey Technologies

Identifying the right problem is the first step in solving it. When it comes to blockchain as a solution, however, it's best applied when the problem exists for multiple parties, and each party can benefit by addressing it. In other words, the problem you identify must be one you share with other parties in your business network. These problem sharers make up your ecosystem.

Whether it affects a private ecosystem—like your own supply chain for instance—extends across your industry or spans multiple industries, the business problem could be friction or a lack of trust. Friction can come in the form of inefficiencies that increase the time or cost it takes to conduct business between parties like a transaction. A lack of trust can be due to an absence of accurate, or timely, information to verify data authenticity, resolve disputes or more. If you've found a process with these types of problems, then you have the beginnings of a blockchain use case.

In this chapter, we're going to answer these questions:

- How do you identify potential business problems?
- How do you prioritize which problems to solve?
- How do you calculate the benefits of solving those problems?

Scenario mapping is an IBM Design Thinking tool that consists of mapping out a specified stakeholder's current process to understand where improvements can be made. An As-is Scenario Map is done from the perspective of one user, mapping a timeline of actions, feelings and thoughts as that user moves through a process. It identifies specific phases of interest and helps articulate areas where users feel pain most.

Founder's tip →

Start with deep industry or subject matter expertise.

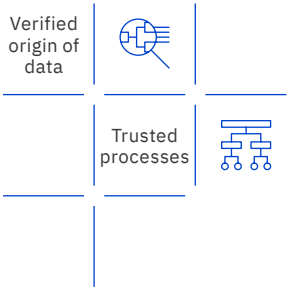
As you define the potential problem, asking the following questions repeatedly can provide answers to how pervasive or limited the business problem is throughout a company, industry or ecosystem. They can also help determine how expensive it is to fix and whether it requires regulatory review and compliance:

1. What's the problem with the way we do things today?
2. Who is this a problem for?
3. Why is this a problem?

Identify pain points

Based on your professional experience within your industry, identify a specific process currently creating friction among multiple parties in the same ecosystem. We recommend focusing on a use case with the greatest amount of friction. This method will ensure you'll have a reasonably scoped, beginning solution and increase the likelihood of solving real pain points. It will also allow you to define areas of interest and focus as you identify pain points. Then, conduct interviews with key stakeholders to understand their pain points and needs through a technique we call scenario mapping.

For example, let's scenario map an insurance remittance application. As a founder, you could interview an accounts receivable representative who routinely experiences friction in reconciling payment data. Or perhaps you want to better understand pain points in a cross-border supply chain application instead. In this case, you could interview customs officials and bankers to better understand their experiences.



Blockchain's core value proposition

Blockchain can increase privacy, enhance trust and remove friction within a business network, but its core value proposition rests on two key elements: the verified origin of data and trusted processes, such as workflows.

1. Verified origin of data: While blockchain doesn't guarantee data veracity, it does make it clear who put what data onto the ledger and when.

2. Trusted processes, such as workflows: Blockchain creates the ability to track each step in a workflow so that permissioned parties can understand and track how data flows through the process.

Blockchain's value proposition also hinges on providing consensus, provenance, immutability and finality to participants' data in a business network. A good blockchain use case will deliver one or more of these benefits.

Consensus

Blockchain consensus allows organizations to have the same data set view even when the data set can be changed or updated by individual parties. If one party changes or updates the data set, all parties can see the changes and updates. Industries that rely on shared reference data, such as bank routing codes, employment records, title insurance and others, benefit from consensus.

Provenance

All transactions on a blockchain are tied to one another through an append-only process called hash chaining. Each transaction is tied to those that came before it, resulting in a tamper-proof audit trail. The trail allows participants to know where an asset was first logged and how its ownership has changed throughout its lifecycle on the blockchain.

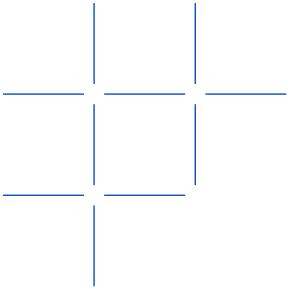
Industries like manufacturing, transportation and supply chain can benefit from blockchain's provenance capability. They need to track how often and through how many parties an asset changes hands, especially in cases where recalls are commonplace and costly.

Immutability

As previously described, each block is linked to the previous one. No participant can credibly claim that an earlier transaction changed or didn't occur. Any industry with audits and regulatory compliance will derive its principal benefit from blockchain's immutability, including seek and find access for auditors and regulators, because it creates a permanent record of all transactions.

Finality

Participants complete and finalize transactions when they meet specified contractual conditions. When the blockchain executes these transactions, it makes them complete and final immediately. So, if one party sends an erroneous transaction, reversing it would require an equal transaction in the opposite direction, but both transactions will be visible. This visibility is why, when assessing the need for finality, you should consider whether the ability to create instantaneous and tamper-proof transactions would benefit all parties. For example, banks and corporations in the global trade industry benefit from blockchain's near-instantaneous finality. Using Internet of Things (IoT) devices, organizations can execute transactions to help sellers draw down a buyer's letter of credit at specified points during shipment. In current processes that do not use blockchain, transactions can be delayed or come at a greater cost due to the frictions associated with physically signing documents, currency fluctuations and more.



A distributed ledger is a type of database that's shared, replicated and synchronized among the members of a decentralized network. It keeps transaction records among participants in the network, such as the exchange of assets or data.

Aligning blockchain's value proposition to your solution is an iterative process

Now that we've defined blockchain's unique value proposition, we can now align it to a solution for your business problem.

Founder's tip →

Determine a blockchain fit.

1. Do multiple parties need to share trusted data without a central authority?

The fundamental value of blockchain lies in its shared ledger, an append-only distributed system of record across a business network. Think of it as the Apple App Store; the App Store is the ledger, and the apps are the records. You need both the technology platform, App Store, as well as the records, apps, to make it work.

2. Do parties need to transfer assets between each other?

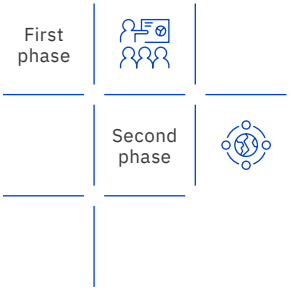
At its core, a blockchain solution should manage the transfer of anything with tangible or intangible value. Assets can be physical like a piece of fruit, digital like an electronic file or data, or intangible like a letter of credit or contract. Blockchain is used to record the transaction of these assets between multiple parties in a business ecosystem. If parties don't need to transfer assets, a traditional database will suffice.

3. Do participants need privacy?

One thing that separates permissioned blockchain from traditional distributed databases and some cryptocurrency-based blockchains, such as bitcoin, is its ability to permission the data. Participants can transact privately across the network to ensure that confidential information, as well as their identities, are not broadcast.

4. Do participants need a greater trust?

Heavy regulation and frequent audits are typically a strong indicator of distrust within an industry. Because blockchain assets have a verifiable audit trail and can't be modified, inserted or deleted, the network's shared ledger becomes the trusted source of information for all parties. Also, mutually selected business network members can electronically endorse transactions on a case-by-case basis, fortifying trust even further.



Key phases and next steps

Assuming your use case aligns with blockchain's value proposition, you can now consider the scope of your first project. There are two critical phases to shaping your solution.

In the first phase, you need to prove that the technology is fit to ensure that blockchain can provide the benefit you envision. Start with a small number of assets and a select group of participants—for instance, a ledger with a real-time view of compliance, audit and risk data for auditors and regulators.

In the second phase, conduct a broader pilot to prove the business case and the business model for the solution, keeping the end state in mind. Consider what types of participants will likely join your future network, as well as what geographies and other characteristics you must design for. While you should start with a participant subset, understanding how the whole network will benefit from the solution will be critical in designing one that can scale to the opportunity you envision.

"We heard about blockchain like everybody else. And we were like, we don't know what we don't know. You can either hire people who do, or you can work with a partner that does know."

— **Dennis Meurs**
Vice President and General Manager Transaction and Clearing Services, Syniverse

Syniverse use case

Syniverse started its journey with the IBM Garage™ team to uncover what business problems it saw out in the market. Through a two-day IBM Design Thinking Workshop, the IBM Garage team and Syniverse worked side by side to step through the process of identifying a use case and diving into pain points for Syniverse's users. Together, Syniverse and IBM plan to build the next generation of clearing and settlement for telco carriers.

"The core of my business is the clearing and settlement of roaming transactions," Meurs said. "Take my case," Meurs continued. "I live in Luxembourg, I'm in New York, I make a phone call. So, I'm roaming on an American network. There's a little file generated, which will usually be sent to a clearinghouse—in this case, Syniverse—which then gets settled between the two carriers. We literally do billions and billions of transactions a day. With upcoming 5G, there are more and more players. There will be more and more connectivity. That's what blockchain enables in a much easier way."

Watch how Syniverse and IBM have created a successful proof of concept (POC) and are in a position to transform clearing and settlement in the wireless industry.

Watch here

B

Form your ecosystem

B

Form your ecosystem

When participants work together to solve their shared business problem, they create an effective and vibrant ecosystem.

As a founder, the organizations you bring together will make up your blockchain network and determine its success. Members of your blockchain network will likely include participants with whom you already have an existing relationship. You might deem these potential participants vital within your organization today. When working with existing partners in a new multiparty interaction model—the blockchain solution—you'll find that adhering to status quo approaches is an inherent challenge. So, a founder must convey and promote the advantages of pursuing and applying a new multiparty interaction model early and often.

Founders will want to thoroughly scope a participant's potential for solving the shared problem and evaluate how that member fits in the new ecosystem. Nontraditional members might fundamentally impact the business model's success for the blockchain solution, so make sure to include all essential players. Some of the most disruptive use cases might cross traditional industry lines. Also, keep in mind key geographies, regulatory environments and other factors to assure future scalability.

A common question asked by new founders is: "When forming a blockchain ecosystem, whom should I include?" Depending on your use case, you could consider participants from your existing business networks. Your established relationships and processes with them might be a good starting point.

However, a more fitting question to ask is: "What types of participants could help pioneer an effective ecosystem?" The answer? Anchor participants.

Nontraditional partnerships

During the COVID-19 global pandemic, unlikely partners joined forces to address shared humanitarian needs. Nontraditional suppliers—apparel and auto manufacturers—began producing personal protective equipment (PPE) and medical devices to become full production manufacturers. Federal, state and local governments became nontraditional mass-scale buyers of PPE and medical devices. These nontraditional suppliers and buyers will need to collaborate to address shared supply chain challenges.

Anchor participants can act as a springboard to encourage additional key member participation. They can bring industry credibility and provide financial, human, physical and intellectual resources.

Take the IBM Food Trust™ network, for example. In its earliest stages, Walmart served as the primary anchor to prove the blockchain technology. It added invaluable industry-specific knowledge, applied resources and thought leadership to help build the solution and provided an active supply chain for testing.

Our initial joint success led to additional participation from key industry players, including:

– Dole
– Driscoll's
– Golden State Foods
– Kroger
– McCormick and Company
– McLane Company
– Nestlé
– Tyson Foods
– Unilever

This industry-wide involvement proved that sharing information on a single trusted system could work with collaborators and direct competitors alike. In other words, blockchain made it easy for diverse parties to transact with one another without requiring a central authority—especially when there were varying levels of trust between them.

Many different forums and approaches exist for bringing organizations together to form a blockchain ecosystem. However, it might be easier to start from the context of an industry association or working group. One working group where we've seen the strongest results, for example, came within the framework of an IBM Design Thinking Workshop.

With the following tips, we'll share our thoughts on what it takes to build the right ecosystem, how to grow it, and what special factors to consider when getting started.

A segment refers to the role that an organization provides in a blockchain network.

Most organizations using blockchain technology face a new and challenging reality: direct competitors often reside in the same network. To prove competitors can work together in your initial pilot—and, eventually, in your ecosystem—include multiple participants of a given segment. The IBM Food Trust network included multiple retailers in its first stages, creating credibility for other competitors to join the ecosystem.

Founder's tip →

Establish your MVE.

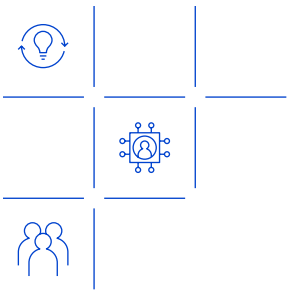
You might ask: "How many organizations should participate in my pilot network?" Because the answer can fluctuate depending on the use case, industry, production stage and level of trust, we recommend you first determine the key segments that will make up your ecosystem in production. It's better to ensure critical segments represent the network rather than include an exact number of MVE participants.

In the IBM Food Trust network, nine participant segments were identified, including retailers, farmers, truckers and others. To minimize complexity, however, we launched the initial pilot with only three segments: retailers, suppliers and trucking companies. This smaller group understood the core concerns and was able to solve problems quickly.

As you progress from project to pilot, you'll test assumptions around the technology and the ecosystem. And as you extend into production, your MVE size and number of anchor clients might start to grow.

In the first phase, as you try to understand the value of blockchain for your business, it's possible to begin with only two participants. This simple configuration will help you evaluate the use case and technology fit. Our rule of thumb is to begin with at least three participants during the formative stages of your network, including key segments, as we did in the IBM Food Trust example.

Three to five participants will ensure enough input and feedback to build a solution with shared value and can encourage others to join. Notice the odd participant number suggested. A low, even member number can result in split votes when making decisions, leaving your ecosystem in gridlock.



Founder's tip →

IBM Design Thinking Workshops help MVE collaboration.

A hallmark of an IBM Design Thinking Workshop is its ability to bring participants together to share inspiration and collect feedback. Here's how a workshop can help when building your blockchain ecosystem:

Bring key stakeholders together

Hold an early design thinking session to help establish credibility and trust across participants. And while learning about blockchain's potential for their business and industry is enticing enough for some prospective partners to attend a meeting, the real value will come when you:

– Bridge divergent points of view.
– Talk through expectations and requirements.
– Set up processes for how parties will coordinate.

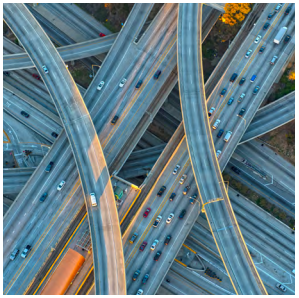
Create as-is and to-be business models

Before you begin, envision your future business model. Many networks opt out of rehashing as-is business models to prevent conducting business as usual. They jump to a to-be model instead. As you envision your future business model, ensure each member gets the appropriate data source access and that it provides important, new value not available to them before.

To get to the to-be model, first review the four key blockchain benefits discussed in Section A: consensus, provenance, immutability and finality. Then, consider how those benefits will affect the business network while you identify areas of tangible cost savings or process improvement for each ecosystem member.

Determine incentives and shared value

When building a blockchain solution, success hinges on the ability to create value that resonates with all ecosystem participants. The exact value will likely differ for each member. And it's essential to create an incentive model that adds value early on, but you should build incentives dynamically to allow for change over time.



Your ecosystem participants—one of the most important input sources—should provide you with their opinions about incentives, too. You'll want to know what they hope to get out of the experience. We'll talk about incentives in more detail in the next section on creating your business model.

Here are five key incentives for organizations to join an ecosystem:

1. **Cost reduction from increased operational efficiency**
2. **Improved customer experience**
3. **Revenue opportunities to help reach new customers**
4. **Potential cost avoidance through operational risk reduction**
5. **Increased industry influence and thought leadership**

Grow the ecosystem

After building a solution with operational stability among your initial core participant group, you might open up the ecosystem to the next set of members. If so, accelerate participant recruitment as the network moves from pilot to production. Create a digital onboarding process; make contracts click-through, standardize legal documents and automate all billing systems.

When recruiting new participants, prioritize network growth and focus on the benefits of your solution instead of the technology. In most cases, organizations only care if you can help them solve their business problems in a secure and cost-effective way. If you've successfully developed the solution and business model, each added participant should yield additional value.

Founder’s tip →

Drive additional network adoption in five key areas.

IBM has identified five key areas that can drive additional network adoption: value proposition, enterprise grade, standards, usability and future vision.

Value proposition

Founders want to attract segment members with a resonating value proposition to reach maximum adoption. Companies will join the network and participate only if they see a tangible return on their investment of time and resources.

Enterprise grade

Participants must feel like they can trust the solution with their business-critical systems. They'll place special emphasis on data security, auditability, resilience, reliability and scalability.

Standards

You must use existing standards and ensure long-term interoperability. This practice avoids reinventing existing capabilities and custom technology that can be difficult to maintain in the long term. You must also plan for interoperability to ensure that other solutions in this domain can operate with your network. Interoperability will help accelerate the pace of innovation for your solution.

Usability

You must provide a user-friendly solution for a Fortune 50 company IT department, a smartphone-only-using small business owner and everyone in-between. Deliver a variety of tools and access points, so the solution works for all groups.

Future vision

How you pitch the future direction of the solution will likely sway the adoption of it. When we talk about extended value, we mean it concretely: once you place data and transaction partners on a single, distributed system, consider how to use the data and connectivity to unlock more value for participants. Value examples include extending geographic reach, functionality, participants and more. A functionality value example could be new analytic tools.

Founder's tip →

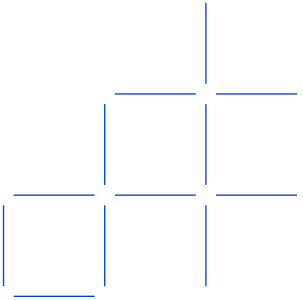
Incentivize early MVE participants.

Early MVE participants enjoy a unique characteristic which blockchain provides: the iterative work environment. An iterative work environment provides an advantage to many organizations, including startups, due to the legal complexity inherent in traditional commercial partnerships. In other words, it allows participants to ease into relationships, and they can iterate on ways to add value without predefining the exact nature of the engagement.

In the early stages, objectives aren't limited to monetizing the solution. Early incentives can also include early access to experimentation and testing, and business model hypotheses on potential participants. If you get it right in this environment, you'll likely see more success in the next iteration.

Next steps

Ecosystem member participation creates shared value, an important factor when building a blockchain solution. As such, you must devote time and energy to understanding what motivates and drives each network participant. Because only when everyone in the ecosystem participates—a team effort—will you fully realize the solution's value. The need for active member participation is why creating a compelling incentive model will be the key to your solution's success.



"The problem that we're trying to solve, now, with the Vertrax Blockchain is this lack of visibility in [the bulk liquid distribution] supply chain."

— **Vinny Mullineaux**
CEO, Vertrax Inc.

Vertrax, Inc. use case

Vertrax, Inc. launched Vertrax Blockchain with Chateaux Software to help prevent supply chain disruptions for its bulk liquid distribution customers through data collection and supply flow predictions. Oil, fuel oil and propane supply chains are complicated and massive disruptions are common during the winter months when demand increases, delivery trucks break down, and trains derail due to snow issues.

"In talking to our customers and our prospects, the notion of them being able to manage through disruption in that supply chain is probably the biggest thing of value," says Vinny Mullineaux, CEO of Vertrax, Inc. "They can muddle by with lack of visibility in a normal situation," he continues, "But when disruption happens, that lack of visibility means they just lose a lot of money."

Vertrax sought a trusted, secure, flexible, and easy-to-use way to share real-time data with the supply chain network. It wanted to give its customers the tools to make critical supply chain decisions as quickly as the weather changes. Two challenges Vertrax faced, however, were that potential blockchain ecosystem participants could be fierce competitors, and each came with its own computing environment.

For example, Vertrax's biggest propane customer had five suppliers willing to input their data on the blockchain network, but the suppliers are also each other's competitors. In other words, the competing suppliers didn't want each other seeing one another's data. IBM Blockchain Platform provided the privacy the suppliers wanted in a security-rich environment without needing to migrate their IT systems.

"With the IBM Blockchain Platform we don't have to worry about making the technology work. Instead of weeks and months to build the technology, we stand up in minutes."

— **Vijay Rathna**
Director of Enterprise Applications, Chateaux Software

The results? Vertrax provided total visibility to its customers through its first-of-its-kind blockchain solution with the IBM Blockchain Platform. "To get a three-day heads-up that there's going to be a demand spike because of a polar vortex, that he's [the customer] going to be a million gallons short," Mullineaux explains about the data collected from the blockchain ecosystem. "He can juggle things around, he's not going to lose all his margin. We've actually got something that's real value, that's new technology. [And] there's no oil and gas company out there that can't be a participant."

"Right now, we know this can scale for millions of transactions," Rathna continues. "We are looking forward to new network participants and how we can scale this even further to handle billions of transactions. We're also looking forward to applying artificial intelligence to get more insight into the data than what humans can predict."

Get a more in-depth view of Vertrax, Inc. and its blockchain journey here.

View here

C

Design your business model

C

Design your business model

As a founder, you make two key economic decisions for your blockchain solution: the investment case and the business model.

After forming your MVE, you can design your business model for the blockchain network. Also, you'll build the investment case, justify costs and demonstrate the benefits to your company in this phase. But remember, you're not alone. You must design an economic model that supports value for the founders, the participants in your ecosystem and anyone else who is permissioned to join later.

Founder's tip →

Evaluate the permissioning level needed for your ecosystem.

Blockchain networks vary in their permissioning levels, based on the unique needs of their use cases. Some can be fully open—permissionless—while others can be highly configured and controlled by the owners, participants or elected subset of participants in the network. To better understand this spectrum, let's think about these analogies from life: a public park, a nightclub and a members-only club.

Public permissionless: Anyone can walk into **a public park**, including you, but your behavior matters. The park's authorities might not require you to provide identification (ID) to gain entrance, but you're expected to follow the rules. Your good behavior would be rewarded with additional time in the park. Your bad behavior would prompt authorities to kick you out.

Public permissioned: **A nightclub** experience differs slightly from a public park. Although it's open to the public, additional rules and restrictions apply. You must gain permission to enter by showing a valid ID to the club's bouncer or doorperson. Owners and clubbers trust this process to know your presence is permitted. Behavioral rules still apply, but membership is not required.

We won't go into great depth on all the components of an enterprise blockchain network in this handbook, but you can find great primers and educational resources here: ibm.com/blockchain/resources

Private permissioned: **A members-only club** is the ultimate example of permissioning. Only club owners can bestow membership to give you access. In addition to gaining entrance, your membership can come with a set of privileges to include anonymity and the ability to connect with other members privately.

These three previous analogies represent the key levels of permissioning possible in your blockchain solution. They'll help you determine how to answer the following questions when designing your business model:

– Will participants pay a membership fee? If so, how often will participants pay?
– Will participants pay a transaction fee?
– Will select members receive more or less of the value created?

In this section, we'll provide insights into these questions and others as you design the business model for your network based on the type of ecosystem you've decided to form.

Smart contracts

Smart contracts and ledgers are the foundational components of the blockchain infrastructure and operations. They help establish transparency and consistency for the data, rules and processes through a set of programmable contracts that govern the interactions between participants.

Traditionally, organizations perform contract transaction processes manually. They depend on each participant to interpret and codify the business rules and execute them independently. The results are often inefficient for most business models.

The basic business concepts in any business network:

- *Business networks connect participants.*
- *The network might, and typically does, need to identify participants.*
- *Assets flow over business networks.*
- *Transactions describe asset exchange.*
- *Contracts underpin transactions.*
- *A ledger logs the transactions.*

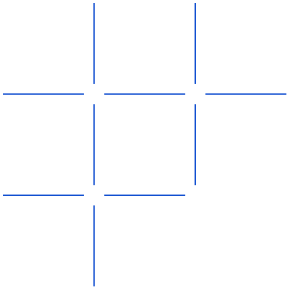
Enterprise blockchain builds upon these concepts and provides clear advantages.

By contrast, smart contracts are opportunities to create efficiency and transparency in your multiparty workflow. They provide efficiencies in the definition, management and execution of business transaction logic that result in mutually accepted and valid transactions in the network. These transactions act upon the state of business objects or assets defined and managed in smart contracts and ultimately recorded in the ledger.

Additionally, smart contracts can provide the business agility to facilitate the secure and mutually verifiable exchange of any asset without the need for third-party services. They're executed automatically without intervention because the conditions of smart contracts are agreed upon by all, or a subset of, members beforehand.

Ledger

Like a smart contract, the ledger represents a key foundational component of a blockchain network. A blockchain is a distributed ledger technology that provides a ledger, which is immutable, shared and distributed among participants. The ledger allows only append operations. At all times, there's an immutable record of changes made to the state of business objects or assets represented in the ledger. As highlighted previously on smart contracts, transactions adhere to agreed-upon contractual guidelines for a valid transaction. The state of an asset can't be altered without another approved append operation on the ledger based on smart contract logic. This ledger is shared under governance policies that dictate what data can be shared with which participants, under what privacy and encryption methods and, therefore gains an often unprecedented level of trust as a source of truth.



Anything that's capable of being owned or controlled to produce value is an asset.

Founder's tip →

Identify opportunities for smart contracts.

When designing your business model, you'll find that identifying opportunities for smart contracts often happens naturally. As you decide whether to implement a smart contract for a specific business rule, it might help you to consider these questions:

1. **Do multiple members need to agree on the business rule?**
2. **Do all, or a subset of, members need to sign each transaction?**
3. **Will a smart contract help establish trust and transparency among members?**

If your answer is yes to one or more of these questions, it might make sense to implement a smart contract for the business rule. Work with your MVE to hash out the details around how the smart contracts function and how they're implemented once you've identified some initial opportunities.

Assets

Contained within smart contracts are conditional statements, "if-then" logic, that evaluate and execute transactions and record information onto the ledger. They can be as simple as a data update or as complex as a self-executing contract with conditions attached. For example, a smart contract can update a bank account balance and ensure that enough money is in an account before executing a debit.

An international shipment can provide a more complex example. Here, the smart contract verifies the required funds a buyer possesses before releasing a shipment. Then, the smart contract automatically releases the shipment and transfers funds to the seller at key points along the delivery.

"Moving to a token-driven economy," an IBM Institute for Business Value report, provides a great overview of how tokenization works and the value it provides.

Transacting with assets

When building your blockchain solution, you'll need to determine how assets will be digitally represented, modified and transacted within the network. If the primary purpose of the solution is to trace the history and lifecycle of assets, you simply need to assign the assets a digital identifier, like a serial number or a vehicle identification number (VIN). Then, as participants transact, you can track the assets in the transactions recorded onto the ledger.

In other cases, you might want to do more with your assets like use them as economic units to divide, trade, store value or provide utility on your network. These cases are instances where tokenization comes in handy.

Conversations about blockchain networks often spur enthusiastic discussion about tokens and tokenization, which can often be confused with cryptocurrencies. Though tokens can be created to act as coins or currency, security tokens and utility tokens are other token types. We won't explore these concepts in depth in this handbook. So, for the purpose of this discussion, we'll refer to tokens as the digital representation of assets on a blockchain, where the token characteristics and the rules that govern it are encoded into a smart contract.

Tokenization opens the door to new possibilities and ways of doing business. For example, tokens can also represent ownership rights to assets like real estate or tradeable permits. Veridium, a software company, works with IBM to tokenize carbon credits—tradable permits that allow the holders to emit a specified amount of carbon dioxide or other greenhouse gases. This process allows permit holders to monetize their unused carbon credits with ease, incentivizing the move toward environmentally conscious practices.[1]

Unlike currency, blockchain network members can digitally trade tokens directly without a third party. As a result, tokens can provide faster transaction settlement, reduced counterparty risk or increased liquidity of assets. For example, stocks or mortgage assets are traditionally complicated and time-consuming to purchase; traders often wait for documents or settlement to transfer their ownership. Tokenizing stocks and mortgage assets will let you trade them in real time.

Ensure each business member receives a positive ROI. The ROI will incentivize new members to join and transact on the network.

Founder's tip →

Link the investment case and business model.

As a founder, you make two key economic decisions for your blockchain solution: the investment case and the business model. Although these decision exercises are linked, they're two separate activities. Let's examine each.

Investment case

You need to determine if the investment it takes to create and launch the network will yield the return you're looking for. This exercise is tied to your individual goals, financial assumptions and appetite for risk.

For networks where value is predominantly derived by one or a few participants providing a differentiated service, you should think about whether you and the cofounders can bear all the upfront costs. The founders will recoup upfront costs through business revenue or from new process efficiencies if the blockchain solution is successful. If the upfront cost is too large for a single founder, that founder might need to reach out to close partners, upstream or downstream, to help build the solution. If the partners help, they would share the solution's generated value. Take caution, however. Issuing tokens to help share the value might be an option for you but seek appropriate legal counsel due to the current regulatory risk.

For solutions where value is mostly derived from increased membership and participation, think about what MVP attributes will attract early entrants and how they can attract other participants. You'll want to decide whether to charge a small fee to kick-start the solution and whether you'll reimburse the fee to early entrants once the network reaches a certain size. In some use cases, founders might create a solution that significantly increases the overall value of each transaction. In other cases, a one-time membership fee, annual membership fee or per-transaction fee might suffice.

When your solution creates value, how will you distribute profits? One option could include distributing profits based on the number of referrals to the network. For example, if company A refers X members, they receive Y% back, which could cover part of company A's membership fee. Another option might include reinvesting profits

back into the network. Reinvesting could build further solution capabilities, maintain the solution or lower the price per transaction.

Business model
After you've justified the investment for your organization, you can begin designing the business model. When you design the business model, you need to:

– Create the plan for shared value.
– Decide how to return value to founders and solution members.
– Devise a plan to sustain and maintain the solution.

Founder's tip →

Calculate value together early.

Your solution's stakeholders will become your initial blockchain network participants, so get input from them as early as possible.

Their collective input will help ensure that the value proposition resonates with each and every joining member. Plus, a collaborative approach will incentivize participants to drive value in the solution.

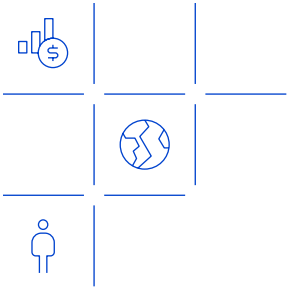
Craft the value proposition

Crafting the value proposition is a quantitative exercise. You must craft one for each type, or segment, of participants who will contribute data to the solution. Founders often need to demonstrate the solution's value to their potential partners to entice them to join. Here's how:

1. **Calculate how much value the solution costs with the existing process.**

2. **Calculate how much value you can transfer back to the participants.**

3. **Identify specific metrics, such as dispute resolution time savings or reduced transaction costs, and attempt to calculate the solution's value for each type of participant. You can discover and document the solution's metrics using a business value assessment.**



Founder's tip →

Ensure members see a positive ROI.

Ensuring that all business members see an ROI will motivate them to join and transact on your blockchain network. But the incentive could differ for everyone in your network. Various segments could receive different value propositions and, likewise, participants within those segments. Differentiators like size, current level of technology, geography and so on will lead to different value propositions for individual participants.

Ultimately, you'll pursue a specific use case that creates a unique business model. However, based on core business models and the types of permissioning we've seen, we'd like to provide you with a few recommendations:

Blockchain solutions benefit from economies of scale. Remember the public park analogy from before? If the blockchain solution is like a park, its value will grow as its size and collective participation increases. As participation increases, the overall cost lowers for others in the network. And as participants become members, they'll share the effort of sustaining the solution's need for maintenance, fixes and new functionality.

The same can be true for the nightclub analogy. But the barriers to entry and possible capacity limits might result in a higher floor for transaction costs versus a completely open and public network.

Finally, we look at the members-only club analogy. In networks where a few core members dominate, requiring a "members-only" fee could be useful. Participants who help establish the network might want to profit from the activity on it. As a result, to attract members that use the service or want to join the blockchain network, you might need to implement transaction fees as an incentive. Combining these different mechanisms of monetization allows for the greatest value potential while mitigating network risk.

The solution’s value might also dictate the business model. If the value is relatively fixed on a per-transaction basis, then you could recoup a portion of the cost. The recouped portion could go toward network maintenance. If the value is variable instead, then you might apply rules around variable transaction fees to account for seasonality or peak usage. Think of a nightclub that asks for a cover charge at peak hours or lowers its prices at happy hour to manage customer volume.

Finally, remember to consider the new revenue opportunities and cost savings possible once this level of shared data is available. It’s likely other parties in adjacent industries will express interest in the data, which might create additional opportunities to monetize the network and the data within it.

Founder's tip →

Remember the intangibles.

As we've stated throughout this section, founders must offer sufficient benefit to ensure a positive ROI, convince others to convene a network and bring the ecosystem along. But intangible benefits provide a tremendous opportunity to motivate participants, too.

The intersection of local energy providers, consumers and retailers provides an example. Allowing consumers to pay for products and services with energy tokens might actually drive more local shopping than without tokens. Over time, this behavior might even influence additional members and retailers to join.

Intangible benefits like these examples might drive up the network's overall value proposition, helping it collect even greater revenues. At the same time, you might distribute this revenue to groups outside the direct network as a means to uphold its overall value proposition.

Next steps

Only the participation of all players in the ecosystem can fully realize the true value of a solution. For full participation, you must create a compelling incentive model that includes key cost reductions, as well as greater value for all involved. Creating this successful model will accelerate your ability to scale your solution.

Lastly, your network can connect with other networks to use other solutions and provide additional benefits which have yet to be discovered. In other words, your network has the potential to scale over time. Remember, new technologies will emerge, and new opportunities will present themselves, so you must be ready to reinvent your offering.

"We're using blockchain to make ticketing smarter, and it all goes back to the fact that everything that goes into the blockchain is permanent."

— **Steven Dobesh**
Co-founder and President, True Tickets

True Tickets use case

A big issue for ticket buyers who attend concerts and sporting events is counterfeiting. A buyer might buy a ticket in the marketplace that won't get them into their desired event. "Roughly 400 million tickets are sold in the primary market every year," says Steven Dobesh, co-founder and president of True Tickets. "Another 200 million are sold in the secondary market—that we know of. Other tickets are being sold 'under the table,' [through] Craigslist [and] other mechanisms." With the current system, there's no way to keep track of it all.

It starts with the buying frenzy of scalpers. "Within seconds of an event going on sale, the tickets are harvested in the thousands by a small but ruthlessly efficient army of [scalpers], many using multiple credit cards to bypass the limit on the number of tickets that one person can purchase," wrote Rob Davies and Rupert Jones in The Guardian. But, according to Dobesh, the counterfeiting threat primarily exists in the secondary market when tickets are resold.

Estimates range that 50 to 100 million dollars' worth of tickets sold are counterfeit. When a customer buys a counterfeit ticket and presents it at an event, scanners will detect that the ticket is fraudulent. Naturally, the venue will deny the customer access. Besides creating a disappointing customer experience and artists losing out on revenue, not much else can be done with the current system.

Blockchain technology provides an ideal tool for adding the end-to-end transparency and security lacking in the ticketing business. That's why True Tickets is working with Chateaux Software Development Inc., an IBM Blockchain Business Partner, to build a ticketing system on the IBM Blockchain Platform. The True Tickets app verifies the identities of all buyers and sellers, ensuring that both the tickets and the people buying them are authentic. "It's all about making sure that ticket is valid and it's getting into the hands of the right person," says Matt Zarracina, co-founder and CEO of True Tickets. The app acts as an immutable ledger, allowing artists, venues, promoters and fans to track a ticket through each lifecycle stage, from creation to its use at an event.

A challenge in creating the True Tickets blockchain solution was making sure to maintain privacy for buyers and sellers. True Tickets had to be aware of how it was putting personally identifiable information on the blockchain and adhere to jurisdictional laws.

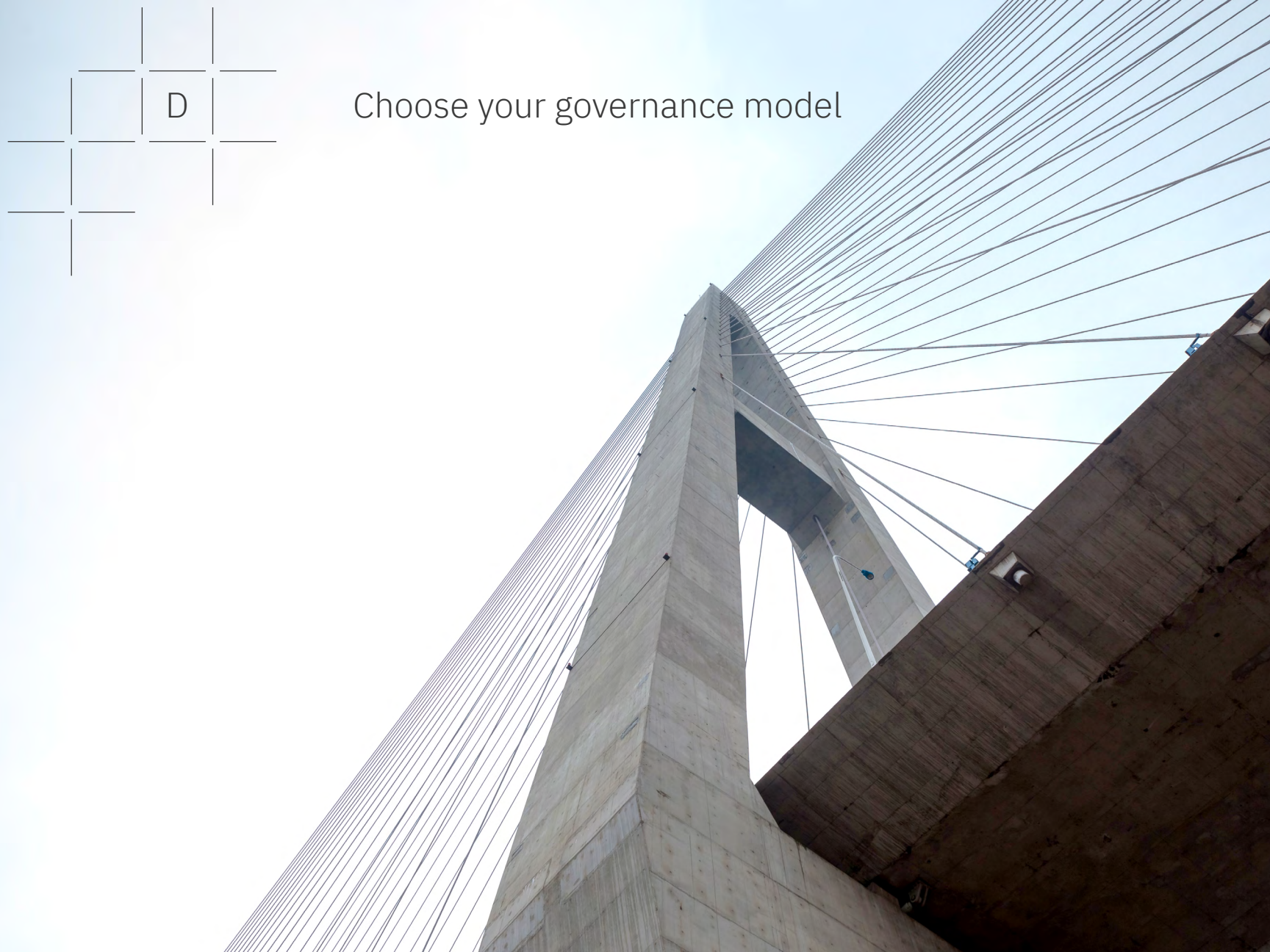
One key function that benefits both buyers and artists is the ability to establish rules around a ticket's resale. Establishing ticket resale rules helps artists benefit from the secondary market and ensures prices are controlled. For example, the solution can establish a ceiling, so a 20-dollar ticket won't be sold for more than 100 dollars. Once the ticket price goes above 20 dollars, the solution's tracking capability helps ensure that artists still get a cut.

"Our goal is to connect artists and true fans, and we think we can do that by enabling them to buy tickets through blockchain technology," Dobesh says. "With blockchain technology, tickets bought in the primary market are secured [and] traceable throughout the entire ecosystem. Once you put tickets on the blockchain, you make them counterfeit proof."

Learn more about the True Tickets solution here: "How blockchain technology is helping bands and their fans."

D

Choose your governance model



D

Choose your governance model

Governance is a crucial factor in the success of your solution, your ecosystem and your business model.

We like to say that blockchain is a team sport. Its decentralized nature allows multiple stakeholders to contribute to how a solution is built, run and operated. However, when many participants interact within any business network, conflicts and breakdowns in processes sometimes emerge. A governance model provides a framework that can provide guidance and conflict resolution. It's one of the elements that distinguishes one blockchain network from another.

Governance models within blockchain networks are still evolving, but their most important function is to guide how participants interact with one another. In this section, we'll cover key considerations that both blockchain founders and users should review when evaluating the design, development and implementation of a governance model.

Governance overview

There are two components that shape a governance model: incentives and a mechanism for coordination.[2]

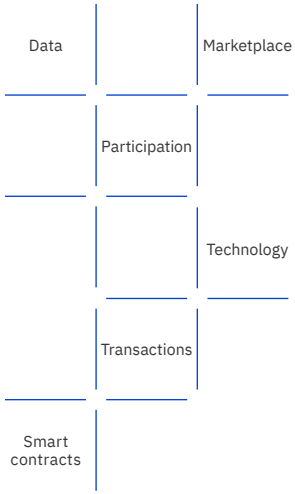
Incentives

The blockchain solution must provide incentives for participants. These incentives can vary among participants, but overall the solution should provide incentives that encourage cooperation and align to common goals within the network.

Mechanism for coordination

When participant incentives don't align, which is often the case where multiple organizations are involved, the blockchain solution must be designed in such a way to provide a resolution process motivated by common objectives.

Six key solution governance considerations



Let's consider two governance areas when building a blockchain network: solution governance and blockchain governance. Solution governance refers to the set of rules that determine how different organizations interact with each other. Blockchain governance refers to the structure and process determining how the distributed ledger framework itself is maintained and evolves over time.

Founder's tip →

Consider these six keys for solution governance.

As you consider the type of governance model you want for your network and the path to achieve it, we've identified six solution governance areas to focus on: data, marketplace, participation, technology, transactions and smart contracts.

Data refers to data ownership and data security. The network should provide clearly defined ownership and security strategies before inviting participants to join. Some initial questions you should address when considering the governance model include:

– Who owns the data submitted to the network?
– Who owns the insights made from that data?
– What kind of data security and data privacy does the network need?
– If members leave the network, can they take their data with them?

Marketplace refers to the rules around bringing the solution to market. Much of the marketplace factor hinges on the future state of the network, so developing a decision-making process is better than defining specific rules from the outset. Here are some questions to ask if you build a revenue-generating solution:

– What's the model and how will revenue be shared?
– Will you incentivize participants to bring others into the network?
– Are participants allowed to build revenue-generating applications on top of the solution?

Participation refers to topics around network access and onboarding. Ask yourself:

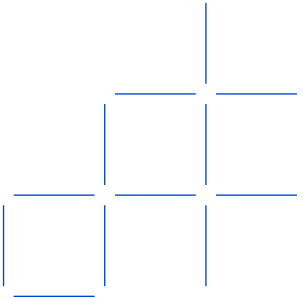
– Is manual or digital onboarding appropriate for your network?
– What's the actual process?
– What types of roles will participants play?
– What's the process of revocation if a participant wants to leave the network?
– When the participant leaves the network, how will you treat the participant's data?

Technology refers to the technology stack used, Intellectual Property (IP) ownership and infrastructure costs. Many of these discussions will be resolved early on, but you should have a strategy for evolving the solution as it grows, as well as the underlying technology. Consider the following:

– What privacy level will the blockchain require—user, administrator and data?
– Will the network contribute advancements to the underlying open-source distributed ledger technology (DLT) framework?
– Will the technology stack require a blockchain-as-a-service platform?
– Are participants entitled to the solution's source code ownership?
– How is the cost of technology shared?

Transactions refers to the exchange of value on the blockchain network. These questions are typically answered with MVE participants as they evaluate solutions to be run on the network:

– What types of assets can be transacted?
– What types of participants can submit a transaction and which participants can validate them?
– How many participants are required to validate transactions?
– Do different types of transactions have different requirements?



The blockchain technology you choose for your business case can affect your governance model. Check out this helpful resource to get an inside look on how to build, operate and govern your network with the IBM Blockchain Platform.

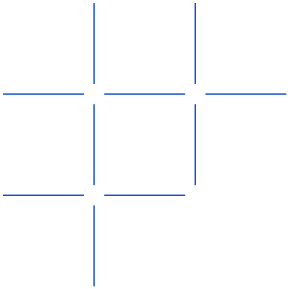
Smart contracts encode the business logic on the network, dictating the conditions under which transactions are approved, coded and maintained. They help establish trust and efficiency as an inherent part of the network's functioning and, therefore, you should seek to include your MVE in these conversations. Additionally, during the process of writing smart contracts you'll need to work closely with your engineering team to ensure they accurately capture the business logic as agreed upon and intended by the ecosystem members. Key questions to consider include:

– Which parties are responsible for reviewing and approving the smart contracts?
– What verification measures are needed to assure the validity of data shared among participants?
– How can ecosystem members verify that the code accurately represents agreed-upon conditions?
– What's the approval process for implementing changes and new smart contracts?

Address governance with blockchain technology

The governance considerations previously outlined all deal with your solution's business model, so ensure your governance model appeals to new organizations looking to join the network. Design them in a flexible way so governance can evolve over time as the network grows and matures.

Consider your blockchain technology carefully because your choice of technology will affect the governance model. For example, some DLT frameworks are more open than others. Look for a framework that's openly governed by a third-party organization that has a track record of successfully managing open-source projects like The Linux Foundation. Beware, some DLTs attempt to create the appearance of being open by creating their own open-source community, which is often just a veneer of openness. Ideally, your DLT framework should include contributors from a diverse distributed community of developers.



Blockchain is still a developing technology, so your solution should adapt and innovate likewise. Open-source projects benefit from rapid innovation based on the contributions from a wide community, but you must also manage the project effectively to ensure stability and long-term viability. Therefore, choose a DLT framework with a reputable governing body and open, transparent methods for decision-making.

As an example, Hyperledger Fabric provides an open governance framework, backed by The Linux Foundation's 20-year track record of managing open-source projects. An executive committee and a technical steering committee govern the project. This open-source, collaborative software development approach ensures transparency, longevity, interoperability and support.

Founder's tip →

Protect your solution with a robust security plan.

A benefit of blockchain technology is it creates a tamperproof, immutable ledger of critical data. However, you must still install rigorous security and access controls to protect it. Consider the possibility of system failures and access breaches and put a technology and governance plan in place to address unexpected issues when they arise.

Next steps

After reviewing the key concerns and drivers for your governance model, you might benefit from seeking legal advice; legal considerations can significantly impact your business decisions. You should also seek frequent input on governance from your network participants. They'll likely have different regulatory requirements depending on their industries, geographies and roles. Lastly, remember that best blockchain governance practices will continue to evolve, so applying the latest practices will be an ongoing effort.

"With this infrastructure-sharing, banks do not need to invest on their own."

— **Veerathai Santiprabhob**
Governor of the Bank of Thailand
(TokenPost, May 2019)

The Thailand Blockchain Community Initiative use case

Every year in Thailand, banks issue more than 500,000 letters of guarantee (LGs) worth more than THB 1.3 trillion (USD 43.2 billion). As with many manual processes, banks want to accelerate transactions and minimize risk of fraud while reducing overall costs when it comes to issuing LGs.

IBM and Kasikornbank Public Company Limited (KBank), one of Thailand's largest banks, launched an enterprise letter of guarantee network based on the IBM Blockchain Platform, which became the Thailand Blockchain Community Initiative (BCI). The new solution is designed to help simplify and expedite the LG process for KBank and other banks in the ecosystem. Plus, it was built with the ability to scale up and meet an expected increase in digital LG issuance.

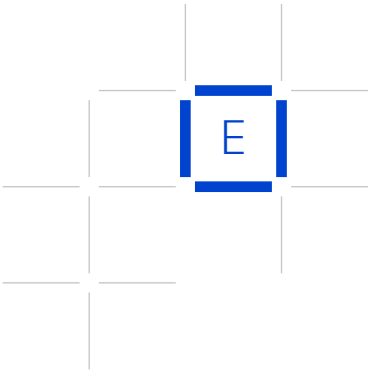
KBank's enterprise LG solution is completely paperless. The goal is to improve the customer experience, strengthen security and reduce costs for clients and the banks. The transparency provided by blockchain can help eliminate forgery and provide efficient service delivery. The current network also has the ability to scale up as the volume of LGs increase. Also, by offering a single, shared data structure, the blockchain solution lays the foundation for new business models to be created by the banks in the region.

"As Thailand's largest issuer of letters of guarantee, KBank is working with IBM to implement [blockchain] technology to further define and articulate our leadership in this market," said Pipit Aneaknithi, president of KBank. The consortium initially incorporated with six shareholder banks, Bangkok Bank, Krungthai Bank, Bank of Ayudhya, Kasikornbank, TMB Bank and Siam Commercial Bank (Ledger Insights, May 2019). As of June 2020, the network of banks and beneficiaries consisted of more than 25 members, including HSBC, BNP Paribas and Bank of America Thailand.

"Blockchain reduces traditional transaction barriers and can help to improve business processes in the financial services sector and beyond," said Parnsiree Amatayakul, managing director of IBM Thailand. "As IBM continues to support KBank's important initiatives in blockchain, the value this technology can bring to the bank and its clients is becoming increasingly clear and can redefine the way businesses in the region operate and grow."

E

Consider legal matters



Consider legal matters

Legal matters will become increasingly more important as you begin interacting with solution cofounders and anchor clients.

As you build your blockchain solution, you'll encounter some unique legal matters due to its distributed nature. A few areas that can create complexity and require a careful approach are:

- Data-sharing regulations
- Industry-specific regulations
- Intellectual property
- Liability and general commercial agreements, such as service-level and performance assurances
- Local and international law

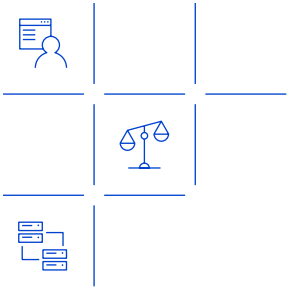
While the material in this section is intended to provide readers with issues for consideration, it isn't meant to replace the assistance of a qualified lawyer. As soon as you and other founders begin working on a blockchain application, it's imperative to seek proper legal counsel to address these and any other issues specific to your use case.

Jurisdiction

A blockchain network might span numerous jurisdictional boundaries, making determining legal jurisdiction tricky. In a typical commercial contract, the parties choose which jurisdiction will govern, assuming they have a reasonable nexus with that jurisdiction. You'll need to consider where the work is being done, where the resources are located and where the companies are based. To identify the best location that benefits most parties, perform a full evaluation of the jurisdiction.

Data protection and privacy

Data on a blockchain benefits from several unique characteristics of the technology compared to data stored on a traditional database. For example, the use of cryptography to secure records and private keys to function as digital signatures provide added security around the transactions.



Additionally, the decentralized nature of blockchain technology makes it more difficult for bad actors to access and alter data, which is distributed across a peer-to-peer network. As an added precaution, however, you should manage encryption key generation by limiting the number of entities that can generate encryption keys and limiting access to those keys. Here are examples of what you would manage:

– Ability to generate encryption keys
– Frequency of encryption key replacement
– Encryption key access
– Encryption key shut off when an employee leaves a company

From a legal perspective, consider the node locations and the type of data stored on the blockchain. These factors can trigger additional laws and regulations that must be followed, including HIPAA, FERPA and GDPR. From both a compliance and performance perspective, you should seek to understand what data is necessary to store on chain and what data can be stored off chain. Questions you should ask yourself when making this decision include:

– Is the data necessary for the use case?
– Do network participants require access to the data?
– Is there a need for consensus and endorsement of the data?
– Can I store a hash of larger data on chain while storing the actual data off chain?

Antitrust law

Antitrust law, also known as competition law, is another legal consideration that may impact your network's blockchain solution. Antitrust law seeks to promote competition and protect consumers from anticompetitive business practices, such as price-fixing. Generally speaking, any action that potentially limits competition can be considered a violation. Anytime two or more entities in the same industry begin sharing information, a variety of competition laws can be triggered, depending on the jurisdiction. Take special care to establish measures and avoid creating the potential for a violation. In some situations, even something as simple as preventing network access to certain entities can violate antitrust laws.

As a means of simplifying disparate antitrust laws and decreasing the risk of noncompliance, some network founders have opted to include an antitrust policy within their governance model. Legal experts develop this policy, and it serves as a set of rules that all ecosystem participants must abide by to participate in the network.

Ownership of intellectual property

One major area of discussion for corporations working on a joint blockchain solution is the ownership of intellectual property (IP). Under the United States common law, the inventor maintains the sole right of ownership. If there are multiple inventors, all inventors have joint rights of ownership. If a third party is contracted to build the blockchain solution, the outcome is typically open to negotiation. It's also common for other parties, including the technology provider, to receive some use rights through an explicit license with ecosystem participants. While it's not always definite, these guidelines can be used as a basis to start addressing IP.

Liability

When multiple entities collaborate on a project of any kind, including a blockchain network, they want to know who's liable. While you can't remove all risk associated with liability, it's possible to mitigate it. Typically, the primary means of mitigating risk are waivers or limitations of liability and agreements to indemnify other parties for certain claims.

A waiver of liability is commonly used to reduce the likelihood that another party will file a lawsuit against a company. The contract states that the parties understand they will participate at their own risk and agree that neither party has any liability to the other. Similarly, a limitation of liability provision is often included in contracts to provide a cap on the potential financial exposure for the parties, specifying which damages are subject to the limitation and which damages are excluded and therefore waived in totality.

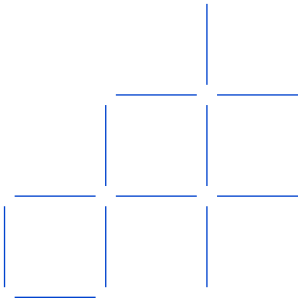
An indemnification provision is another way to secure protection against certain third-party claims. To be clear, these provisions aren't intended to cover claims between the parties in the agreement. Typically, the scope of covered claims is set forth, such as claims of copyright infringement, and a process for notification and resolution of claims.

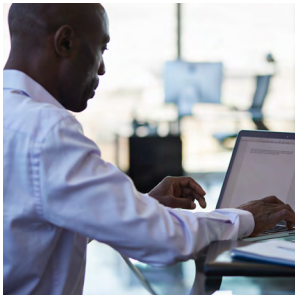
Smart contracts

A smart contract is a self-executing computer protocol intended to facilitate transactions between ecosystem participants. A set of agreed-upon rules govern smart contracts as in a typical agreement. The solution executes smart contracts automatically on behalf of ecosystem participants using electronic signatures. Whether smart contracts are legally binding depends entirely upon a jurisdiction's recognition and acceptance of electronic and digital signatures. Again, seek legal counsel to determine whether a smart contract is deemed valid and binding.

Next steps

It's never too early to seek legal counsel. Legal matters will become increasingly more important as you begin interacting with solution cofounders and anchor clients, especially when creating the network governance model. When you search for counsel, look for those with blockchain experience. You'll want to know if they primarily work on initial coin offerings, or if they specialize in permissioned, private blockchain networks for enterprise use. The laws governing these networks are vastly different from each other, so it's important to understand a counsel's true areas of expertise.





we.trade use case

Banks have traditionally facilitated international trade deals; they have served as intermediaries and provided financing for transactions while mitigating risk. However, banks haven't digitally transformed trade finance in decades, and trade finance is either not scalable for banks, or too complicated and costly for the majority of companies. As a result, almost 70% of companies haven't had access to trade finance services.

The many legal, financial and cultural risks associated with trading with foreign partners might have also discouraged companies from trading internationally. Often, companies lack guarantees that a contract will be enforced. Any delay to a payment or a delivery due to a lack of enforcement can hurt a company's cash flow, further risking the timely fulfillment of other trade contracts.

we.trade worked with IBM to develop a trading platform built on the IBM Blockchain Platform on the IBM Cloud. The solution provides two main features that help empower enterprises of all sizes to take part in international trade: DLT and smart contracts. DLT and smart contracts enable companies to trade seamlessly, simply and with trust. Also, the fact that the contracts are written into the platform's code removes the need for any underpinning legal system or enforcement mechanism.

DLT makes it possible for documentation to flow transparently yet securely among banks, logistics companies and freight companies based on permissions. Bank customers can easily create trade orders online and manage the entire trade process from order to payment. And the we.trade platform enables businesses to create smart contracts on the blockchain to dictate the commercial and shipping conditions of agreements between trading parties. This system helps businesses scale by triggering automatic payments based on events.

"You can imagine that each country [that joins the blockchain solution] brings its own level of expertise, brings its own people, its own policies, its own requirements," explains Roberto Mancone, co-founder of we.trade Innovation DAC. "At one point you have to establish rules. We have to act as if we're one company. We're sharing the blame, sharing the resources and sharing the risk."

A company looking to participate in trade can be brought onto the we.trade platform by their bank, which eliminates potential concerns about the ability to trust counterparties. All relevant parties can access the same secured and shared blockchain information regarding trade deals at the same time, and no single party controls this data. For example, if company A changes the terms of its trading agreement with company B, then it will alter the cryptographic hash in the blockchain. The platform will alert all other parties, including company B, banks and any other intermediaries, to the change immediately. Users also go through international know your customer (KYC) processes to ensure they comply with applicable anti-money laundering (AML) regulations, which mitigate these risks considerably. All these measures significantly reduce counterparty risk and make trade finance services safer and more accessible to small and medium companies.

"We have made significant achievements with we.trade, but this is only the beginning," Mancone continues. "We are confident that, working with IBM, we will be able to expand our offering and simplify trade not only in Europe but in the entire world."

Learn more about we.trade here: ibm.com/case-studies/wetrade-blockchain-fintech-trade-finance

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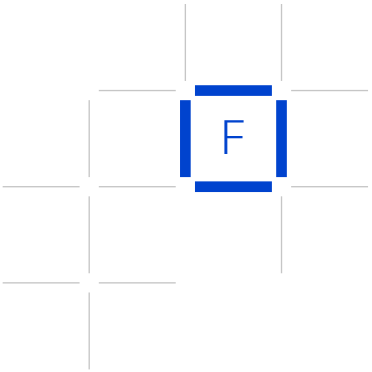
Start building your blockchain solution



Start building your blockchain solution

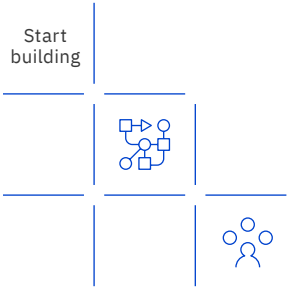
"You cannot develop something on a standalone basis. Blockchain requires people who are willing to create a minimum viable product with a minimum platform, which is accepted by a decent number of counterparts."

— **Roberto Mancone**, we.trade Innovation DAC co-founder

A few parting thoughts

The bottom line is to make blockchain real for business; you need to bring your ecosystem together and find the shared value for participants in your network. We understand this task is easier said than done. You have, or will have, big questions. And in reality, most founders are tasked with answering all of them—all at the same time.

Throughout *The Founder's Handbook*, we've started addressing some of those big questions. We grouped the biggest issues into a few categories to make it easier for you to find the answers. We interviewed dozens of startup founders, corporate innovation leads and blockchain solution pioneers, including our own. They've already delivered thousands of blockchain engagements around the world, and each of them has had a series of wins and recommendations, along with pitfalls and cautions. Ultimately, our goal is to bring their common experiences and best practices together to help accelerate the blockchain journey for you.



At IBM, we believe passionately in the transformative potential of blockchain, and we want to broaden your understanding of how to get started in building a blockchain solution. But this step is only the beginning. Like any good innovation, this edition is only the third release of *The Founder's Handbook*. Founders are still figuring out answers to more big questions, so we invite you to join future iterations. Share your stories and the lessons you've learned as you become a blockchain solution founder and an author of the next great chapter in business innovation.

What will we solve together? Let's find out.

Start building your own solution:
cloud.ibm.com/catalog/services/blockchain

Join the IBM Blockchain ecosystem:
ibm.com/blockchain/ecosystem

Provide feedback on *The Founder's Handbook*:
ibm.biz/FoundersHandbook_Survey

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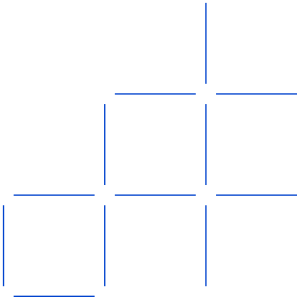

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Notes and sources:

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