Welcome to the Redesigning Trust toolkit, designed to guide you and your organisation through the development and deployment of a new blockchain solution. Before you get started, a few things you should know:

Who is the toolkit for? While anyone can use the toolkit, the content assumes that your team or organisation has identified a good blockchain use case via an honest evaluation of the technology as compared to other options. While useful for blockchain deployments generally, this toolkit focuses on supply-chain deployments.

What’s in the toolkit? There are 14 modules in this toolkit with specific tools and resources throughout to help make the included information more readily useful to your project. It draws upon lessons from more than 40+ global supply chain use cases.

What’s not in the toolkit? This toolkit does not include resources for determining whether blockchain technology is the right fit for your use case or for evaluating your organisation’s digital maturity. More information about the scope of the document can be found in the Assumptions section.

How should the toolkit be used? The content is modular, not linear. The aim is that you will use the toolkit as a handy reference for your project, reviewing different modules as needed, whenever needed, depending on your particular project’s needs.

More details are included in the Using the toolkit section at the end of the Introduction module.

Supplementary reading -
This toolkit builds upon previous publications released by the World Economic Forum. The following whitepapers were published as a series on Inclusive Deployment of Blockchain for Supply Chains:

- Part 1 – Introduction
- Part 2 – Trustworthy Verification of Digital Identities
- Part 3 – Public or Private Blockchains – Which One Is Right for You?
- Part 4 – Protecting Your Data
- Part 5 – A Framework for Blockchain Cybersecurity
- Case studies and learnings from the United Arab Emirates
- Part 6 – A Framework for Blockchain Interoperability

Interactive version
An interactive version of this toolkit is available online and it offers a digital spreadsheet consolidating the main tools and key questions of the toolkit for you to download and tailor.
The foundations: How to think about blockchain deployments

Before you dive into the modules, there is some important context to keep in mind. Remember that blockchain is simply one tool in an organisation’s digitisation journey. As such, here are a few foundational themes:

The enterprise environment: meeting enterprise rigor and requirements
While the technology is still nascent, blockchain requires the same features and rigor that one would find in almost any government or corporate technology implementation. Figure 1.2 shows nine essential considerations that organisations typically need to address to ensure the success of any new enterprise solution. The items on this list are grounded in IT best practices and project management principles that are likely already familiar to the reader. This toolkit is intended to help your organisation think through and meet these typical enterprise requirements in the context of blockchain technology.

These considerations – and their relevance to compliance, corporate governance, and personal privacy laws and regulations – will affect how organisations structure their blockchain solutions. For most supply-chain use cases, the requirements mean organisations are likely to prefer permissioned solutions, where participation is subjected to identification of all parties, sensitive data confidentiality, and adhering to the system rules. As such, the toolkit focuses mainly on permissioned blockchain solutions – a common approach for enterprises – rather than permissionless blockchain solutions like Bitcoin, though many of the learnings can be applied to both. The Structure: Public/Private module explores the trade-offs between permissionless and permissioned systems in more detail.

Figure 1.2 – Essential considerations typical for enterprise technology solutions

Known and Trusted Participants
Formal Governance
Operational Integrity
Regulatory Compliance
Scalability
Security
Interoperability
Defined Business Outcomes
Information Sharing Agreement
Key Enterprise Requirements

Figure 1.2 – Essential considerations typical for enterprise technology solutions

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Making decentralisation work for organisations

Decentralised processes will benefit from blockchain technology that is designed for automating decentralised process. The current challenge is that many supply-chain processes today use technologies that are designed for siloed centralised processes. Hence, a rigorous review on both process and technology is needed when evaluating blockchain as a fit to ensure that the given processes and use case will benefit from decentralisation. Governments and businesses must recognise that a business process that is inherently centralised or designed based on centralised trust controls may not be effectively automated using blockchain.

Decentralisation should not be an all-or-nothing objective but rather a balanced objective that requires consideration of trade-offs. There are practical reasons why a system may require both centralised and decentralised components.

However, decentralisation benefits degrade quickly when centralised components are added. Thus, if centralisation of a component is required as a transitional stopgap measure, then the organisation must recognise what decentralisation benefits will be lost during that phase of operations and must have a concrete plan for migrating to decentralised components when doing so becomes feasible.

Distinguish applications from underlying layers

Blockchain technology has its own nomenclature to navigate. Terms like “blockchain solutions,” “smart contracts,” and “decentralised applications” (Dapps) can overwhelm many newcomers. A development or project can, for example, be referred to as a “blockchain solution” or “blockchain technology” for simplicity sake.

Nonetheless, understanding what your project entails is important. Are you selecting underlying layers – for example infrastructure such as Blockchain-as-a-Service, network, and protocols – or realising a decentralised application? It is important to distinguish and understand the difference between Dapps and the underlying blockchain platform. For example, when you assess the security of your solution, the implications at the application layer will be different than at the underlying layer.

For a more detailed and technical overview of different layers within a blockchain reference architect or blockchain technology stack, overviews are available from Enterprise Ethereum Alliance¹¹, International Organization for Standardization (ISO)¹² or Deloitte,¹³ among others.

The findings in the toolkit are undertaken in simple terms to bring understanding of some key considerations. For these reasons, the tools do not delve into the multitude of technical layers, complexities and exceptions that exist with blockchain technology, though the authors recognise their existence and importance.

Prepare for change – future proof your solution

Blockchain technology is developing rapidly. Your organisation or industry cannot sit on the sidelines for 3-5 years waiting for the technology to mature. If the blockchain solutions are relevant to your business, you should start preparing a non-technical and technical foundation progressively for the eventual mainstream operations.
• Existing differences will become configurable or interoperable features of future solutions.

• The current need for technology variety within the ecosystem will be rationalised to make the planning process more predictable and repeatable, similar to the world wide web’s evolution in the 1990s.

• There will be a provider cycle where some initial vendors fail to become sustainable and are replaced by next-generation successors.

• Standardisation of blockchain protocols may lead to convergence. In fact, some expect the emergence of a handful of prominent platforms to comprise the backbone of a global network of blockchains that overlay today’s internet.

• As the maturity of blockchain protocols grows over the next decade, the focus of many projects will gradually shift toward new layers of technologies. The future of the technology will likely include purpose-built protocols and platforms for decentralised off-chain computing, messaging, oracle, integration, storage, data management, and identity to complement blockchain and build solutions for the future decentralised web (a.k.a. Web 3.0). This would fundamentally alter the way supply-chain actors are interested in and able to engage with blockchain technology.

What does this mean for planning a project at present?

Given that current platforms could become obsolete over time, it is prudent to consider decoupling current decentralised applications from their underlying blockchain protocols as much as possible.

This can help any future migration to a new platform with less pain and rework. Whatever blockchain technology that you are using today, plan for upgrading or replacing it within 3–5 years.¹⁴

In the short term, there are obstacles and challenges with the adoption of blockchain technology. Today, the technology simply is not fully mature. But that does not mean you shouldn’t participate at this early stage.

Executing on the following activities can and should be done in parallel with the maturation of blockchain technology:¹⁵

**Ecosystem collaboration:** Incumbent participants, many of whom may be fierce competitors within the industry’s ecosystem, need to agree to collaborate using blockchain. This is like radio-frequency identification (RFID) in its early days; before blockchain can reach its potential, business processes and standards must be resolved.

**Data interoperability:** After industry participants agree to collaborate, there is significant effort to define what data will be shared by whom. Industries will need to go through the laborious process of agreeing upon what data belongs on blockchain and what processes should be handled by autonomous software agents, as well as the structure, format, and meaning of the data they share.

When organisations have solved the above two challenges, the industry will be ready to build a blockchain-based platform or solution. It will require effort to construct the system, test and deploy it across a diverse set of participants. New terminology, concepts, and technology usage all mean adoption will take time and patience but holds great promise for supply-chain organisations where the technology is a fit.
A hyper-focus on efficiency gains and a culture where players create barriers to others, can reinforce existing mistrust or competition and undermine or even block the transformation that blockchain technology has the potential to bring about for the supply chain ecosystem.

For those reasons, this toolkit was designed with a set of main principles in mind:

- **Inclusivity:** Everyone can capture some value from blockchain technology. That said, organisations undertaking new blockchain projects need to consider potential unintended consequences as well. It is also important to design solutions that level the playing field for small and medium-sized enterprises and global access.

- **Interoperability:** This toolkit should help to enhance standardisation and end-to-end supply chain integration of new blockchain solutions with other mission-critical tools within organisations. A new blockchain solution may have to share information with other components across different blockchain networks or, more commonly, with legacy enterprise systems that will remain in use throughout the course of a deployment. Being mindful of such compatibility issues will help future-proof the blockchain part of the system at the technical, business, governance, and process levels.

- **Integrity:** Blockchain solutions should provide solid integrity in data, security, authentication, and other important pillars of successful solutions. Given the increased focus on privacy and data compliance, these needs are greater than ever within supply-chain organisations.

- **Fit for purpose:** Users can use the guidelines to pick the best approach and solution for their requirements. The tools and resources in the toolkit were created keeping in mind that users still need to look at the context of their selected use case and distinct requirements.

- **Variability:** The guidelines were designed to be applicable to diverse supply chains that consist of many stakeholders with differing relationships and incentives.
Assumptions

• While blockchain is one type of distributed ledger technology (DLT), for simplicity, the terms are used interchangeably in this toolkit to cover all types of distributed ledger technologies.

• Truly innovative deployments of blockchain require a match between blockchain's specific benefits and use cases that enable realization of these benefits, followed by dedicated hard work to get it right and embedded in organisations and industries. DLT is not a workaround for business processes, nor is its use a guarantee of stakeholder alignment. This toolkit depends on sound business decision making up-front.

• This toolkit is designed to be accessible to those with varying degrees of blockchain knowledge, including those who are just getting started with the technology. The findings in the toolkit are undertaken in simple terms to bring understanding of some key considerations. For these reasons, the tools do not delve into the multitude of technical layers, complexities and exceptions that exist with blockchain technology, though the authors recognize their existence and importance.

• The toolkit does not present answers to all questions and considerations. Instead, decisionmakers can use the considerations, questions and guidelines to pick the best approach and solution for their specific requirements. As the toolkit outlines typical criteria, it is done such that users of the toolkit can apply it to the context of their selected use case and distinct requirements.

• The tools list key considerations, questions, risks and other. These are not an exhaustive list. Furthermore, they should not be equally weighted, but be weighted appropriately in response to the company specific use case, stakeholder complexities and other assessment, e.g. a certain blockchain solution may put more priority on data integrity than confidentiality and availability while others may do differently.

• This toolkit does not constitute legal advice.

Using the toolkit

Who will be using the toolkit?
Organisational Profile
The selection of modules, with resources and tools within, caters to the nuances of cross-border and international supply chain, logistics and trade-related use cases. The resources are designed so that it can be applicable to diverse supply chains that consist of many stakeholders with differing relationships and incentives.

Organisations should have already evaluated whether blockchain is fit for purpose and matching their digital maturity. More information in “Toolkit value throughout blockchain solution lifecycle” section.
Individual User Profile

The toolkit is aimed primarily at individuals and teams involved in the development and deployment of a blockchain solution. Roles and responsibilities that benefit from the resources and tools span functions typically involved in building and scaling blockchain solutions, including project management, operations, IT, compliance, procurement, partner engagement and more. This holistic approach is intentional so that no part of the business is an afterthought. For instance, auditing considerations should not be an afterthought; rather, they should be considered right from the initial scoping and strategy phase of blockchain implementation.

How is the toolkit structured – and how can it be used?

The content of the toolkit is structured into 14 different modules. The modules represent key success and risk factors for the deployment of a blockchain solution within the supply chain context.

Individuals and teams should decide and select the module(s) most relevant to their business questions and needs. Each module is a self-standing read. At the same time, modules are integrated, and it is important to consider the toolkit in its entirety when business decisions are made, together with any new findings and industry-specific considerations not addressed by this toolkit.

How to get started

There are several options for navigating the toolkit:

1. Use the toolkit end-to-end for holistic deployment guidance.
2. Choose the specific topics of interest. Brief overviews of what each module covers are below.
3. Start with your business needs and questions. Navigate Key Questions contains a checklist of deployment needs with links to the related content within the toolkit.

Figure 1.3 – Toolkit modules overview

14 Modules

- **Data Protection**: Explores blockchain solutions that ensure data confidentiality.
- **Structure: Public/Private**: Outlines essential insights on whether public or private blockchains are typically best suited for your use case.
- **Cybersecurity**: Provides building blocks required to deploy blockchain securely covering cybersecurity concepts, risks, and risk management framework.
- **Digital Identity**: Covers considerations to design and implement a responsible digital identity system for a blockchain, especially for a supply chain use case.
- **Data Integrity**: Discusses data integrity aspects needed when deploying blockchain.
- **Risk Factors**: Lists the common potential risks and missteps associated with a blockchain deployment.
- **Interoperability**: Explains interoperability business models, infrastructure, and implementation scenarios. Also covers the key considerations of cross-authentications and ledger node integration.
- **Ecosystem**: Focuses on Ecosystem network effects, business models, typical key roles, and potential value proposition.
- **Consortium Formation**: Outlines key driving factors to join or form a consortium as well as explore consortia types, elements, and pre-agreement concerns.
- **Consortium Governance**: Summarises various aspect of consortium funding, buildout, and operation as well as governance considerations around intellectual property, on-boarding / off-boarding, and data handling.
- **Financial Reporting and Controls**: Discusses considerations related to auditing and financial statements in regards to blockchain design and deployment.
- **Tax Implications**: Highlights the tax implications and how to cater to tax compliance when deploying blockchain solutions.
- **Legal & Regulatory Compliance**: Offers a list of typical potential legal and regulatory compliance issues.
- **Personal Data Handling**: Addresses Personal Data Protections compliance issues related to blockchain deployment such as the European Union’s General Data Protection Regulation (GDPR).
While the toolkit can be used at any time in the blockchain solution journey, the tools and resources of the toolkit are focused on the development and deployment phases. This toolkit starts from the premise that your organisation thought honestly about whether using blockchain is a sound business decision (during phase ideation and use case selection in Figure 1.4).

For any organisation, blockchain adoption should not be a goal in itself but a means to achieve specific business benefits. Before using this toolkit for development and deployment of a new blockchain solution, you should have completed a rigorous business assessment in which the results showed that blockchain is the most appropriate tool to address a specific business need. With that in mind, it is anticipated that the value derived from the toolkit would look something like this through the phases of a typical project:

Table 1.1 shows a detailed listing of specific benefits the toolkit might provide at different stages of a project.

<table>
<thead>
<tr>
<th>Ideation &amp; Use Case Selection</th>
<th>Build &amp; Scale</th>
<th>Ongoing Operational Activities</th>
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<tbody>
<tr>
<td>• Right Mindset during business problem identification, use case validation, and technology assessment</td>
<td>• Guidance to leaders to ensure deployment progresses with integrity, inclusivity and responsibility</td>
<td>• Foresight for deliberate ongoing ecosystem expansion</td>
</tr>
<tr>
<td>• Strategic Foresight to anticipate deployment risks and success factors</td>
<td>• Key Considerations across both technical and non-technical drivers of deployment</td>
<td>• Resources for ongoing solution integrity</td>
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<tr>
<td>• Structured Conversations with internal and external stakeholders</td>
<td>• Structured frameworks to help organisations unlock value from their blockchain solutions</td>
<td>• Principles that can be applied even as the blockchain landscape continues to change</td>
</tr>
<tr>
<td>• Recommended References from World Economic Forum¹⁶ you can use at this phase</td>
<td>• Proactive approach to recognise and manage new types of risks stemming from blockchain</td>
<td>• Ability to revisit important solution design and development considerations and checks</td>
</tr>
<tr>
<td>• Minimum Safety Check before product launch</td>
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