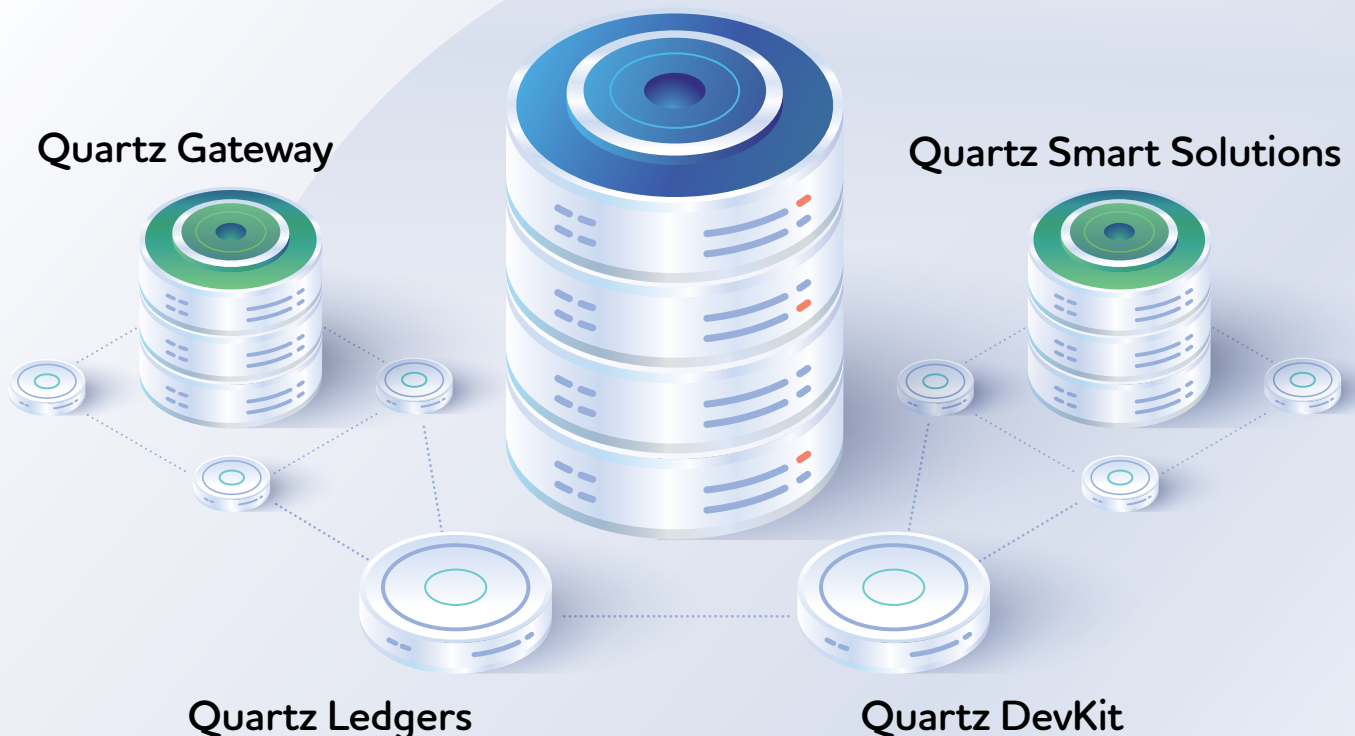


Quartz™ – DLT Solutions for Enterprises and Ecosystems

Co-existence. Integration. Interoperability.



Overview

Distributed Ledger Technology (DLT) has the potential to radically transform enterprises across various industries by creating collaborative ecosystems that can enable a full new range of new business models. A highly resilient technology, DLT can be seamlessly integrated with organizations' existing data-intensive applications in a secure manner. DLT can be used to build immutable ledgers for diverse areas including digital identities and registries, environmental sustainability, vendor contract monitoring, payments, settlements, information exchange, e-Governance, healthcare, insurance, supply chain, provenance of commodities, music, art and collectibles, to bring in greater transparency, accountability and governance in business processes. DLT-based 'smart contracts' facilitate zero touch processes, significantly reducing the need for manual intervention. DLT is increasingly being explored for enabling digital payments transformation with Central Bank Digital Currencies (CBDCs) in retail transactions. The technology has the inherent ability to bring organizations together through the creation of business ecosystems, that can amplify the value delivered by each on a stand-alone basis.

Co-existence. Integration. Interoperability.

In the world of Web 3.0, businesses are actively collaborating in the creation of connected ecosystems which can offer real-time, efficient transaction processing, without the need for intervention from intermediaries. DLT, with its ability to synchronize data across participating entities, builds trust and encourages firms to collaborate in setting up such ecosystems. Firms are best served adopting a philosophy of 'co-existence', of combining the best of their existing solutions with distributed technology, even while moving appropriate parts of the business to decentralized solutions. This approach can help organizations manage risk, save costs and roll out new services that can benefit from the decentralization which the technology offers.

The introduction of DLT into an ecosystem implies that it needs to 'integrate' all connecting systems or nodes. Such an integration is needed, to not only unite existing systems with the ledgers, but to also allow the ecosystem to leverage standard messaging networks as applicable to manage the change and leverage existing data standards.

DLT is an evolving technology with different platforms competing to offer varied features, addressing real-life issues around the need to manage confidentiality, consensus and security. 'Interoperability', with multiple DLT platforms and ecosystems and even non-DLT networks, will be a critical element to ensure that organizations realize their true benefits. Data exchange between various DLT networks will be the first step towards interoperability, further expanding transaction flows.

Quartz - The Smart Ledgers

Quartz solutions are targeted at helping organizations across industries to leverage DLT meaningfully for their businesses. They comprise the following:

- **Quartz DevKit** – A smart contract development kit that enables the development of high-quality code for different mainstream Distributed Ledger technologies
- **Quartz Gateway & Command Center** – To enable the seamless integration of existing applications with DLT ecosystem(s)/network(s) and to facilitate their administration and governance
- **Quartz Smart Solutions** – 'Designed for DLT' business solutions
- **Quartz Ledgers** – Off-the-shelf ledger structures, functions and APIs for business processes across various domains, to enable solutions to be quickly built around them

Quartz Smart Solutions

Quartz Smart Solutions are comprehensive solutions with business and domain-aware 'smart contracts' that help automate processing on the DLT platform. A smart contract is a 'self-executable' software that is stored on the ledger and triggered either because of specific events occurring within it or from pre-configured rules that are programmed into these contracts. Participants can provide, consume and instruct these transactions on the ledger based on their role and privileges. Smart Solutions are designed as a combination of on-chain services deployed on DLT and off-chain services, residing on traditional databases or files, thus ensuring that only business processes well suited for DLT are deployed on chain.

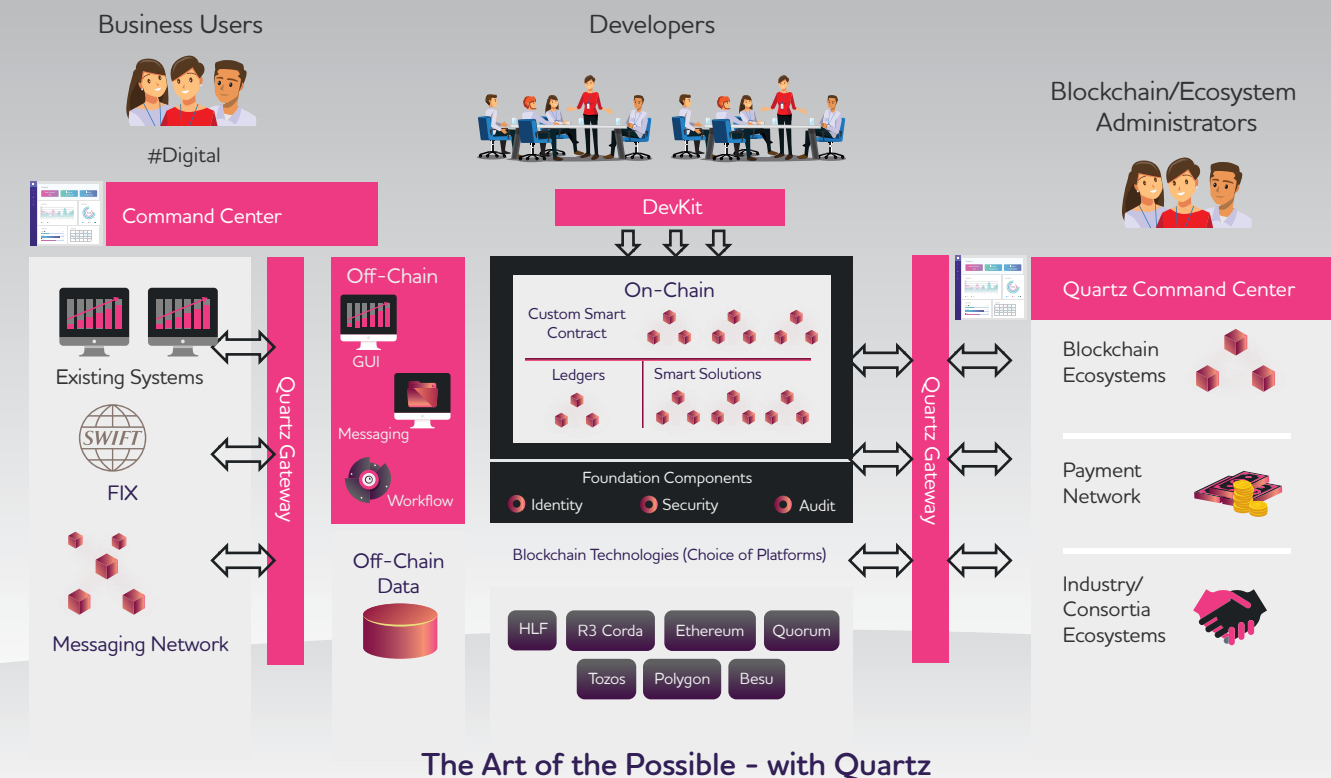
Some of the readily available solutions include those managing Central Bank Digital Currencies (CBDCs), Non-Fungible Tokens (NFTs), Rewards Points, Contract Authoring, Settlements, Announcements, Crypto Services, Loan Securitization, Facultative Reinsurance, Cross Border Remittances, Markets (for Tokenized assets), Contract Performance Monitoring, Resource Management and KYC.

Quartz Ledgers

Quartz Ledgers comprises of predefined, off-the-shelf ledger structures, data models, functions and APIs for business processes across industries. These are conceived as 'building blocks' on which solutions can be developed and deployed seamlessly, thus enabling customers to implement decentralized solutions faster, in an agile manner, and at scale.

Quartz DevKit

Quartz DevKit, an intuitive, low-code smart contract development kit, is designed to help software developers introduce DLT into their business processes, and generate, compile, package, and deploy business code on a variety of underlying technologies including Hyperledger Fabric, Corda, Ethereum, Quorum, Tezos among others. Quartz DevKit also comprises of a standard set of architectural features covering security, data privacy, access controls, user management, audit trails and logging framework, collectively known as the Quartz Foundation Components. Programmers can write smart contracts upto 40% faster using DevKit's pre-built components for platform setup, administration and deployment, platform security authentication, encryption, and node as well as identity and user management. This enables organizations to target faster launch timeframes on DLT, which can be further accelerated by leveraging Quartz Ledgers.



Quartz Gateway & Command Center

Quartz Gateway is a single, smart channel that can help integrate applications with various DLT platforms, industry networks and ecosystems using simple REST APIs. Using the Quartz Gateway, organizations can connect seamlessly to multiple DLT platforms, thereby eliminating the need for large scale and continuous changes to be made to their existing systems. It facilitates interoperability between blockchain platforms and with other messaging networks, and industry standards like ISO. It also supports the orchestration of services across multiple DLT platforms, thus delivering agility and flexibility to organizations operating diverse business processes. The Command Center helps a DLT sponsor to administer and maintain oversight of the entire DLT network. It provides a comprehensive visual representation of all the activities taking place within the DLT ecosystem at any point in time and allows the system administrator of the sponsor to make key decisions when administering the network.

The Quartz Advantage

- **Co-existence and Interoperability:** Quartz solutions are built on this philosophy and can integrate with third-party solutions and various DLT systems and networks.
- **Integration:** Quartz solutions are simple, lightweight and can seamlessly bring together third-party solutions, legacy applications and messaging middleware. They can therefore reduce entry barriers to DLT adoption by insulating connecting systems from the complexities of the underlying DLT.
- **Agile Development Framework:** Quartz DevKit along with the Quartz Foundation can provide an agile framework for faster development and deployment of business applications on a choice of DLT platforms.
- **Deployment options:** Quartz solutions can be deployed on multiple hyperscalers, on-prem as well as in hybrid deployment models providing flexibility based on customer needs

Leveraging these architectural principles and using Quartz, your organization can:

- Create decentralized architectures that can power business ecosystems
- Automate business processes and functions with smart contracts
- Eliminate data duplication and associated reconciliation issues
- Ensure data integrity with cryptographic encryption of data, making it immutable
- Restrict access (private permissioned ledger) to ensure greater security.

Backed by awards from the **Financial Technology Forum** (Best New Post Trade Solution of the Year 2022), **Asset Servicing Times** (Outstanding Innovation Award 2022) and recognition from Analysts (ranked #1 Best Performing Fraud Management Solution by **IBS Intelligence**, ranked #2 for delivery footprint and #3 for its vision and strategy by HFS Research, cited **Leader in Everest Group PEAK Matrix Assessment 2022** and named '**Cryptonaut**' by Celent in 2021), Quartz can help you operate at the forefront of technology innovation and spearhead DLT adoption successfully within your enterprise and beyond.

To know more about Quartz, write to us at tcs.quartz@tcs.com or visit our website <https://www.tcs.com/quartz>

Quartz is a startup incubated in TCS to create innovative solutions that leverage the emergence of blockchain technology

Quartz provides foundational technology, tools and business components for creating distributed solutions for varied industries

To know more about Quartz, please write to us at tcs.quartz@tcs.com, or visit our website <https://www.tcs.com/what-we-do/products-platforms/quartz>

About Tata Consultancy Services Ltd (TCS)

Tata Consultancy Services is a purpose-led transformation partner to many of the world's largest businesses. For more than 50 years, it has been collaborating with clients and communities to build a greater future through innovation and collective knowledge. TCS offers an integrated portfolio of cognitive powered business, technology, and engineering services and solutions. The company's 469,000 consultants in 46 countries help empower individuals, enterprises, and societies to build on belief.

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