tcs **TATA CONSULTANCY SERVICES**

TATA

From concept to practice

The state of technology

QUARTZ

QUARTZ

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From the Editor

Ken Kundis

Marketing Head, BFSI
Products & Platforms, TCS.

We are pleased that you are enjoying the new issue of the Quartz Magazine from TCS! For those of you who are faithful readers of this publication, you know that we strive to be a source of information and a starting point for the conversation around the blockchain, AI and DLT. For those of you who are new readers, let me welcome you and encourage you to take part in the dialogue that we hope will follow.

In this issue of the Quartz Magazine, we focus on the transformation of blockchain and related technologies from something abstract to something that organizations are using to solve business problems of all types– from the highly complex, forward-thinking, and quantitative to streamlining decades-old manual processes. As happens with most technologies, once the "newness" has dissipated, practical applications emerge and steer the trend to roads not even considered when the journey started. This journey includes employing blockchain in industries that initially weren't considered. It also has included extrapolating the technological principles behind blockchain and adjacent technology into thoughtful and innovative new applications.

To start this issue, BFSI Products & Platforms President R Vivekanand walks us through his personal journey across the blockchain and how it shaped the TCS approach. We also report on the Quartz offering and share the story of a successful transformation at our client, Entris Bank. The issue also includes information about our DevKit and Gateway offerings.

As always, we consider Quartz Magazine to be the jumping off place in our conversation about the business impacts of blockchain, DLT and AI. Your input will drive future editions of the magazine, so please reach out to me with your comments and suggestions at ken.kundis@tcs.com.

Me and blockchain:
A personal journey

Foreword by

R Vivekanand

President, BFSI Products & Platforms, TCS.

Like most of us, I watched blockchain's early evolution with academic curiosity and some level of amusement about the hype. In 2009 and the following couple of years, when the word 'blockchain' started emerging as technology separate and distinct from 'bitcoin' or 'cryptocurrency,' I could be forgiven for being cautious and adopting a waiting posture. As a technology professional in the financial services industry, I could see the potential benefits of a decentralized, peer-to-peer network as the foundation of a transaction architecture. But I had also been ringside for some spectacular technology hypes and failures, and 'technology evolutions' that were left on the shelf, and advancements that at the time, seemed like game changers (Blu-ray, and now wearables smart specs, I'm looking at you!).

It wasn't until 2015 that I began to take professional notice of blockchain. By this time, it had become clear that blockchain – while not fully future-proofed or ready for prime time in every scenario – had evolved into a viable financial technology platform as burgeoning communities emerged with full, comprehensive enterprise platforms. Over the next three years, in my then-role as the co-head of TCS Financial Solutions and the executive driving our next-generation product initiatives, I was tasked with deciding what exactly TCS would

do about blockchain, and how best to help our clients navigate this new and uncharted territory.

After assembling an enthusiastic team with financial and technology backgrounds, we began to develop our approach, allowing us to maximize the benefits of blockchain for our clients while not 'jumping on a trend. ' Team Quartz quickly established three operational and architectural principles that still serve us today: co-existence, integration, and interoperability.

Our first critical decision was to understand that blockchain would not be the core business operations for the sort of clients we pursue – then and now – but rather a supplemental technology that would need to co-exist within their existing technology frameworks. Our goal was to identify those processes that would benefit from a decentralized approach and those that wouldn't require a full, architecture-wide evolution. Solutions such as lending, KYC, credit history, bank guarantees and claims adjustment were areas where immutability was well-suited. Then, these new technology apps would need to be integrated seamlessly into the existing technology infrastructure without disrupting the core business operations. Finally, the systems had to demonstrate true data and network interoperability to be truly successful. So, despite living somewhat outside the core processing systems, the provided and received data needed to be fully realized and leveraged within the overall system architecture.

This approach has allowed our clients to craft a blockchain journey that makes the most sense for them, more so at a time when many of them are 'hollowing' their Core. Whether test-driving the blockchain

> Team QUARTZ quickly established three operational and architectural principles that still serve us today: Co-existence, integration, and interoperability.
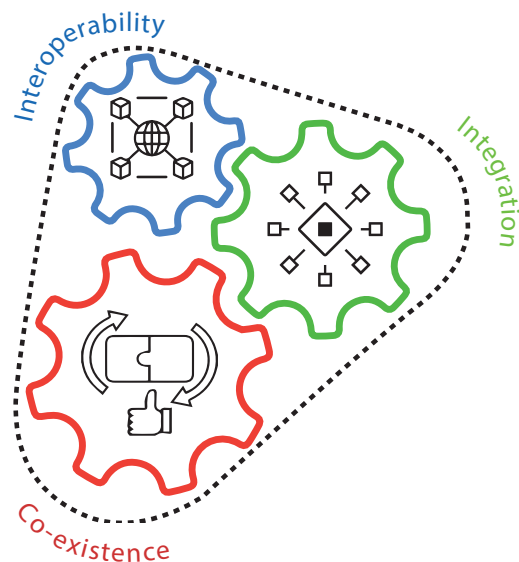
Interoperability

Integration

Co-existence

technology with a small process or taking a large component of their system to automate with blockchain, our clients could create the roadmap they chose and deploy a combination of on-chain and off-chain solutions from us, which was in stark contrast to many vendors at the time who were pushing clients to fully embrace and integrate blockchain into the very heart of their business. We could do this

by developing our Quartz Gateway solution, which allowed easy connectivity between the blockchain-enabled processes and the core processes and controlled and monitored through a command center.

By this point in the blockchain's history, we saw a parade of platforms. Each day, it seemed a startup was coming to market with a great new blockchain platform. "This is the one you need," they would say. And as a result, there was pressure in the industry to 'make a bet' on these emerging platforms.

But, due to the unique attributes of TCS, we were able to take a more measured approach. In many ways, we in Quartz had the best of both worlds where we could be a startup within TCS and

experiment responsibly. We could plainly see that each platform – be it a private authorized system or a digital wallet on Ethereum – had its share of benefits but also incumbent challenges and limitations. Fortunately, the decisions we had made about our approach from the very beginning allowed us to tread a more neutral path. By not championing a particular platform but focusing on open technology

while staying connected to the ecosystem, we had the flexibility to respond to our clients' requests while providing technology leadership to help them navigate their blockchain decision-making. This allowed us to offer our clients a choice, informed by their unique business needs and our egalitarian view of the technology itself. Between 2018-2019, we also started looking at a combination of blockchain and AI (predictive), given the kind of data our solutions had access to.

Today, we are seeing the rewards of the journey. In this issue of **Quartz Magazine**, you will read about Entris, which specializes in transaction banking and business process outsourcing for small and

mid-sized banks in Switzerland. With the implementation of Quartz, Entris will now be able to proactively detect and mitigate fraud and compliance risks, leveraging our AI technology. You will also learn more about our expanding offering, spotlighting our DevKit and gateway solutions in this issue. You will also read about recent recognitions from industry powerhouses, such as The Asian Banker

and Everest Group. Central Bank Digital Currencies (CBDC) have recently been garnering a great deal of interest from the investor community. In this issue, we will highlight our approach to this interesting space and what we feel are the possibilities.

Our journey with blockchain and AI is your journey. Our decisions on how best to approach blockchain have always started with one central driving force: What do our clients need to succeed? That is foundational to everything we do. We look forward to seeing what comes next on our journey with you, including GenAI, of course.

respond to suspicious activities. The solution has helped increase operational accuracy using AI/ML/NLP and parameterization across various business scenarios.

The solution is equally being leveraged by a larger ecosystem of more than 40 affiliate banks of Entris Banking, facilitating screening and providing due diligence feedback to Entris Banking in a privacy-preserving manner. The cloud deployment model ensures additional flexibility in scaling up or down while maintaining security, resilience, and extreme collaboration.

Pascal Baumgartner, CEO of Entris Banking, said, "As the payments industry evolves in Switzerland, we are keen to help our affiliate banks and clients with superior screening and surveillance of payments transactions, increase the speed of onboarding new clients and provide them with enhanced customer services. We selected and implemented Quartz for Compliance because of its advanced capabilities as well as the depth and breadth of functionality in the compliance space. It has significantly enhanced the operational efficiency and accuracy through a single umbrella solution for real-time screening, transaction surveillance and alerting, comprehensive workflow and case management, KYC-related due diligence, and advanced risk assessments spanning multiple lines of business and transaction categories."

"Quartz for Compliance represents a revolutionary leap in transaction monitoring and sanction screening capabilities by harnessing the power of AI/ML/NLP (free text) and the potential to leverage blockchain for handling KYC. We are excited that Entris Banking has embraced our vision for compliance in the future. Our SaaS solution helped the bank to implement more rigorous and effective controls against money laundering and gain deeper insights on client portfolios while safeguarding against financial and compliance risks," said R Vivekanand, President, BFSI Products & Platforms, TCS. "TCS has had a strong presence in the Swiss banking sector for over

> "We selected and implemented Quartz for Compliance because of its advanced capabilities as well as the depth and breadth of functionality in the compliance space."
>
> **Pascal Baumgartner**
> Chief Executive Officer (CEO)
> Entris Banking.

a decade. With Entris Banking implementing our next-gen financial crime-detection compliance solution, we are an integral part of the sector's transformation journey."

Quartz for Compliance is a targeted solution catering to a range of financial institutions' regulatory compliance requirements, spanning KYC checks, sanction screening, risk assessment, and transaction monitoring. The solution is embedded with advanced analytics and various tools facilitating intense surveillance. Its architecture provides well-defined and easy-to-use standard published APIs to quickly integrate existing applications or third-party products in larger ecosystems.

The solution can be deployed as a standalone product or as part of a KYC-as-a-service arrangement that meets end-to-end KYC and risk assessment requirements. The sanction filter module can perform the string search functionality for an organization's client data against various sanctions or public exposed persons (PEP) lists provided by regulatory bodies and other third parties. The solution leverages AI to track behavior patterns in line with FATF and other local regulatory guidelines, monitor statistical deviations, sift outliers from peer transactions, and analyze links to unearth suspicious transactions and activities.

Entris Banking deploys TCS' Quartz for Compliance solution to mitigate fraud and compliance risks

Based in Bern, Entris Banking specializes in transaction banking and business process outsourcing for small and mid-sized banks in Switzerland. With the implementation of Quartz, Entris Banking will now be able to proactively detect and mitigate fraud and compliance risks.

This digital transformation aimed to strengthen Entris Banking's transaction monitoring and sanction screening capabilities. Quartz, an AI-driven anti-money laundering (AML)/ KYC and financial crime-detection solution, assists Entris Banking in managing fraud

and compliance risks, enforcing anti-money laundering and counterterrorism financing regulations, and adhering to Financial Action Task Force (FATF) 40 and IX Recommendations, and international directives from the Financial Crimes Enforcement Network, the European Union, and State Secretariat for Economic Affairs.

TCS' solution is helping Entris Banking address key workstreams for payment screening, anti-money laundering detection, and sanction capabilities, enabling the bank to identify and

Setting up a next-gen insurance repository

Beyond policy digitization

their insurance companies for anything to do with the policy, and for understanding the current status of the policy," explains Malini Raman, Product Head, Quartz. Raman adds that if those physical policies are lost or damaged, the policyholder faces a very tough situation. "If there is a flood, for example, and all the insurance documents are lost because the policyholder had to evacuate and had no time to take the policy documents with them, they would have to go through a struggle to prove they held the policy with the insurer, to create and generate a claim."

Inaccessibility of insurance policies literally can be a life-or-death situation. Often, when an insured person dies, the nominees are delayed in their ability to file a bereavement claim because they do not have copies of the critical documents or don't know where or how to find them.

Document digitization is an essential strategy for addressing these long-standing challenges. Insurers of all sizes are rapidly adopting imaging and digitizing critical documents in the insurance value chain to speed claims administration and improve efficiency, accuracy, compliance, and security.

It takes more than digitalization

However, digitalization needs to address the challenges of scattered and siloed information. But what if insurance policies and other

> "Any business where there is money and data involved – where there is data to be verified before a payment is completed – is a good use case for blockchain."
>
> Malini Raman
> Product Head, Quartz.

critical documents could be held in a secure digital repository that allows policyholders to access all their policies safely and conveniently, like how one would access their shares and bonds? The concept of an insurance repository has been introduced previously. It has been implemented in India for several years to encourage digitalization and protect policyholders and insurance companies. There are currently four repositories in India. The main participants are insurance carriers, agents/intermediaries, and policyholders (personal lines/consumer and businesses/commercial lines).

Insurance repositories bring digitalization to manage insurance

An insurance policy isn't just a document. It is a contract, a promise from an insurance company to its policyholders that they will be protected financially when they incur certain risks and losses (such as property damage, personal illness or injury, or death). The tasks and tactics of managing these millions of policies are now on the brink of a significant technological breakthrough, with the introduction of blockchain and distributed ledger technology (DLT) into the value chain.

Despite dramatic technological advances and countries rapidly moving towards a digital economy, many policyholders still hold their policies in paper form. Historically, a paper contract is useless if lost, damaged, or destroyed by fire, theft, or natural catastrophe. This puts policyholders at a disadvantage when they are at their most vulnerable.

Adding to the cumbersome process of record management, since most consumers and businesses typically have insurance for different types of coverage (e.g., health insurance, auto/motor insurance, life

insurance) with more than one insurance company, insured consumers typically lack a consolidated view of their coverages, much less the ability to manage the documents efficiently when related policies are in paper form.

Paper heightens fraud risks

Paper policies also make it much harder for insurance companies to identify and track instances of misrepresentation and fraud. Paper policies pose enormous challenges regarding fraud, loss of policies, and potential data privacy breaches when shared with multiple entities in the insurance value chain. Paper-based processing delays significantly since information cannot be shared instantaneously with the relevant stakeholders. Further, the proliferation of paper policies impedes the ability of the insurance regulator to monitor improper or illegal actions on the part of insurers as well as fraudulent behavior committed by policyholders.

Typically, "Policies are held in a physical form by the policyholders, who rely on

policies and replicate how financial services firms enable customers to "hold" e-shares in a depository. "An insurance repository is designed to extend the same concept into the insurance space," Raman said. "With a digital depository, customers are safe knowing they can always access their e-shares. They are all held in the same account, and customers can view their insurance product portfolios at any time," Raman said. Similarly, in the insurance space, all the policies a policyholder may own from different insurance companies are held in one account, which the customer can access at any time to view the policy status, premium payment information, claims history, or even something as basic as recording a change in residential address. For example, a change in the residential address will instantly be available to all insurers who are members of the insurance repository.

By digitalizing policies, the insurance repository makes managing these contracts easier and provides transparency to a policyholder's family and beneficiaries. An individual's policy information can be accessed by logging into one account. While the repository itself is the platform and creator of the entire ecosystem (policyholders, insurers, distributors/producers, regulators), the insurance carriers retain the customer relationship and handle all policy administration functions.

Improved transparency

Another benefit of the insurance repository is its ability to promote greater transparency and governance—how insurance companies handle claims and other transactions initiated by policyholders. "Insurance repositories provide a view to regulators" of carrier performance, Raman said. "The Insurance repository can provide the regulator with statistics such as holding patterns, claim pendency, settlement ratios etc. that can help improve transparency and ensure policyholder rights are protected."

Overall, insurance repositories can bring considerable savings to the insurance

industry by eliminating physical paper and reducing instances of fraud and complaints regarding deficiencies in policy servicing.

In Quartz, the focus has been to help our customers operate at the forefront of innovation by leveraging technologies such as DLT and AI/ML. The Insurance Repository solution from Quartz enables insurance companies to digitalize all their customers' policies and seamlessly connects insurers, policyholders, agents, and banks in a blockchain-based ecosystem. This ensures that the policy information is immutable and tamper-proof. All the relevant stakeholders gain instant access to critical information or updates on the policies in the ledger. Policyholders get a consolidated view of all their policies as the Quartz solution allows multiple insurance policies (life, health, property) to be held in a single electronic insurance account.

> **With Quartz, a policyholder can perform the following actions:**
>
> - View policy details
> - View scanned images of policy proposal forms and terms and conditions
> - View account details and make changes, including address changes
> - Receive premium alerts, claims settlement-related updates
> - Receive consolidated insurance statements

Upping the security ante

The Quartz solution for insurance repository harnesses blockchain to create an ecosystem comprising insurance companies, agents, policyholders, banks, and regulators.

"Introducing DLT in managing the functions of an insurance repository makes sense," Raman says, because "any business where there is money and data involved – where there is data to be verified before a payment is completed – is a good use case for blockchain." For example, suppose a policyholder is submitting claims information for a particular event and

is concurrently raising another claim on the same event with a different carrier. In that case, the fraud can be immediately detected through DLT. These validations are done instantaneously with DLT-based smart contracts to prevent another claim from being processed.

Blockchain also adds to the effectiveness of the business ecosystems that insurance

repositories create. Data that other carriers or repository participants might need, such as know your customer (KYC) or address changes, are held in a distributed ledger. All entities in the ecosystem are notified automatically about changes and actions, enabling insurance companies to update their records in real-time. The smart contracts, which are part of the solution, provide

insurance companies with the means to manage claims in a transparent, responsive, and trusted manner.

In summary, the Quartz solution is designed to strengthen the hands of regulators and policymakers who want to radically transform how insurance policies are issued and serviced across their life cycle. It attempts to meet the twin objectives

of delivering a vastly superior customer experience for the policyholder while providing a compelling value proposition to insurers and other stakeholders with its ability to provide instantaneous data, seamless access, and the elimination of fraud through the digitalization of policies.

At global crossroads:

Pioneering seamless cross border transactions in CBDCs

With the evolving landscape of global finance, the introduction of Central Bank Digital Currencies (CBDCs) is a contemporary example of the convergence of financial innovation and governmental stewardship. These digital currencies, backed by administrative agencies and controlled by a central bank authority, give households, consumers, and businesses a secure means of exchanging digital currencies. According to the US-based think tank the Atlantic Council, a total of 130 countries, representing 98% of the global economy, are exploring digital versions of their currencies, with almost half in advanced development, pilot, or launch stages.

As these digital currencies continue to evolve, CBDCs will streamline and simplify cross-border transactions, potentially reducing costs and processing times. In November 2020, G20 leaders endorsed the roadmap for enhancing cross-border payments to address the challenges that such payments face relative to domestic payments, including high cost, slow speed, insufficient access, and transparency. As part of the more forward-looking work of this roadmap, one building block considers how to factor an international dimension into CBDC design.

Several countries, regions, and organizations are exploring or actively working on CBDCs with a focus on facilitating cross-border transactions. More than ever, the International Monetary Fund (IMF), World Bank, Bank for International Settlements (BIS), and Financial Stability Board have been tightly collaborating, each bringing its comparative intelligence and experience to the table. In 2023, the IMF unveiled a research document that built on the previous year's XC (cross-border payment and contracting) platform proposal. This research introduced a concept that could

reshape cross-border payments on a global scale. The proposal visualizes a trusted ledger, akin to a "digital town square," where digital versions of central bank reserves can be efficiently traded among participants.

In collaboration with BIS, the central banks of Singapore, France, and Switzerland successfully concluded a project in 2023, where they tested the cross-border trading and settlement of wholesale central bank digital currencies (wCBDCs). The cross-border project was executed using decentralized finance technology on a public blockchain. The project's proof of concept successfully tested the cross-border trading and settlement of a hypothetical Euro, Singapore Dollar, and Swiss Franc wholesale CBDCs between simulated financial institutions.

Also, technology firms worldwide—in collaboration with central banks and other stakeholders—are working on developing user-friendly cross-border payment platforms that integrate seamlessly with CBDCs and establishing common standards, protocols, and best practices that facilitate interoperability and regulatory compliance.

CBDCs' unique features, enhancements in the other building blocks of the cross-border payments program, such as aligning regulatory, supervisory, and oversight frameworks for cross-border payments, anti-money Laundering (AML) /combating the

financing of terrorism (CFT) consistency, payment versus payment (PvP) adoption, and payment system access will all be critical for cross-border CBDC use. Governments and central banks are further exploring CBDC design choices and their macro-financial implications to achieve the potential benefits for the public welfare while preserving financial stability. Various important and complex questions are still to be further analyzed, for instance, as regards the interoperability between existing and new infrastructures, the access to and control of central bank money, the distinction between wholesale and retail CBDC, the role of private industry actors, and many others.

Quartz solution for CBDCs results from intense research and development leveraging our strong banking and payment domain expertise and our rich technical experience in implementing solutions for central banks, payment infrastructure providers, and commercial banks. The solution supports both wCBDC, which enables central or commercial banks to perform wholesale transactions, and retail CBDC (rCBDC), which allows the public and merchants to use CBDC for retail payments and transfers.

Recognizing the differences in country-level rollout models, the solution is designed for configurability. This includes a configurable account/ wallet structure that can manage

hierarchical accounting requirements, account-based and token-based CBDCs with embedded security features, and the ability to capture programmable tokens, amongst other things.

Applicable to both central and commercial banks, Quartz solution for CBDCs continues to evolve as several use cases are envisaged worldwide.

> "CBDCs will enable multiple currencies to coexist within a digital wallet and simplify real-time cross-border transactions through seamless currency conversions."
>
> **Namitha Jeremiah**
> Product Development Head, Quartz.

Quartz DevKit and Quartz Gateway

Building decentralized apps, enabling connectivity

Speed, efficiency, and improved access are all hallmarks of what a Quartz solution can bring to the table. **Quartz DevKit** enables enterprises to build decentralized applications faster, while **Quartz Gateway** streamlines the configuration, connection, and administration of blockchain platforms and provides seamless connectivity with messaging networks. You can learn more about these offerings below:

Quartz DevKit

• Unified Integrated Development Environment (IDE) for all leading blockchain platforms - Hyperledger Fabric, R3 Corda, Tezos, Hyperledger Besu, Quorum and Ethereum

• Designed to meet end-to-end developer needs, including smart contract design, build, packaging, deployment, and testing

• Metadata-driven low-code development

• Accelerated delivery – More than 40% faster than standard development, saving effort and time

• Developer productivity monitor and user journal to keep track of delivery

• Superior code quality with built-in software quality assurance and vulnerability checks

• Automated release management for managing the release of off-chain and on-chain code bases and APIs, along with release documentation

Quartz Gateway

• Integration channel for more than 10 blockchain platforms, including Hyperledger Fabric, R3 Corda, Tezos, Hyperledger Besu, Quorum, Polygon, Ethereum and Bitcoin

• Standard messaging support – Supports ISO 15022 and ISO 20022, proprietary files, and messages

• Blockchain-as-a-service to click and configure blockchain platforms

• Seamless integration of on-chain and off-chain operations enables wallet/account-based operations, multi-signature wallets, and third-party wallets (MetaMask)

• Member/ user onboarding/offboarding facilities to support DLT-based collaborative ecosystems

• Command center for monitoring and administering of DLT ecosystems

• Robust security features using hardware security modules (HSMs), multi-party computations (MPCs), and key vaults

• Multi-cloud ready (AWS, Azure, Everyware Cloud)
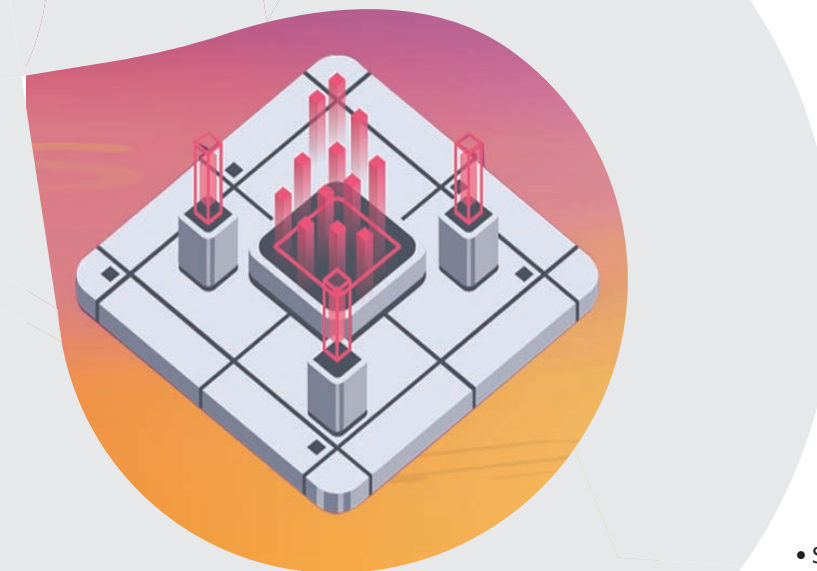
Awards and recognition

Quartz™ has been awarded the best new post trade solution in 2022
FTF Innovation Awards

TCS named a leader in enterprise blockchain services in Aug 2023
Everest Group
From insight to action.

TCS awarded the outstanding innovation award in 2022
2022 asset servicing times INDUSTRY EXCELLENCE AWARDS

TCS ranked #2 in capital markets services by HFS Research in Sep 2022.

TCS ranked among the top 5 providers for enterprise block chain services in Jan 2022
HFS Research

CELENT has named Quartz™ as a leading Cryptonaut in 2021

Quartz™ has been awarded the best blockchain solution in 2019
FTF Innovation Awards

Quartz™ ranked #1 best performing fraud management solution in Jul 2022
IBS intelligence Global FinTech Perspectives

TCS awarded the winner of enterprise blockchain award in 2021
BLOCKCHAIN RESEARCH INSTITUTE EUROPE

TCS awarded the best fraud prevention technology implementation in 2023
THE ASIAN BANKER

About Quartz – The Smart Ledgers

Quartz comprises Smart Solutions, a set of 'designed for blockchain' business offerings for different industries; Ledgers, Off-the-shelf ledger structures, functions, and APIs for business processes across various domains; the DevKit, a smart contract development kit to enable programming of high-quality code on multiple blockchain platforms; the Gateway & Command Center for the integration of existing solutions with blockchain ecosystems and their administration and supervision. Built on the core principles of Coexistence, Integration and Interoperability, Quartz enables existing systems to coexist and integrate with blockchain platforms and other messaging networks. With Quartz, you can facilitate the creation of a complete decentralized ecosystem for stakeholders in your value chain. Quartz caters to organizations across Industry segments including Financial Services, Banking, Supply Chain, Energy & Utilities and eGovernance. To know more about Quartz, please visit: https://www.tcs.com/quartz

About Tata Consultancy Services (TCS)

Tata Consultancy Services is an IT services, consulting and business solutions organization that has been partnering with many of the world's largest businesses in their transformation journeys for over 56 years. Its consulting-led, cognitive powered, portfolio of business, technology and engineering services and solutions is delivered through its unique Location Independent Agile™ delivery model, recognized as a benchmark of excellence in software development.

A part of the Tata group, India's largest multinational business group, TCS has over 601,000 of the world's best-trained consultants in 55 countries. The company generated consolidated revenues of US $29 billion in the fiscal year ended March 31, 2024, and is listed on the BSE and the NSE in India. TCS' proactive stance on climate change and award-winning work with communities across the world have earned it a place in leading sustainability indices such as the MSCI Global Sustainability Index and the FTSE4Good Emerging Index. For more information, visit www.tcs.com

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