IBM Storage Solutions for IBM Blockchain

IBM Storage Solutions for IBM Blockchain offers proven solutions that can help lower risk, reduce costs and increase blockchain performance.

Blockchain technologies represent a fundamentally new way to transact business. They may profoundly change the way we organize our economic, social, political and scientific activities. Blockchain technology has been described as having “revolutionary potential” to reinvent how entire industry ecosystems operate.¹

IBM is the market leader in blockchain technology and solutions.² The company has launched an entire business line devoted to providing comprehensive blockchain solutions, and to date has attracted more than 500 blockchain customers and helped construct 70 live blockchain networks.³

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Highlights

- Reduces risk and cost with pre-tested and validated deployment blueprints
- Provides the performance and scalability blockchain environments need
- Leverages the market-leading capabilities of IBM Spectrum Storage
Blockchain technologies let network participants record transaction records in a trustworthy shared ledger.

The IBM presence in the exploding blockchain marketplace goes beyond providing solutions based on the IBM Blockchain Platform itself. IBM is also deeply involved in developing and offering IT infrastructure solutions designed to enable enterprises of all types and sizes to implement individualized blockchains that leverage both your existing data center systems as well as new technologies and multicloud architectures.

One set of these new infrastructure solutions from IBM is called *IBM Storage Solutions for IBM Blockchain*. These end-to-end, pre-tested and validated infrastructure solutions for blockchain deployments offer a number of important benefits, including multiple high-performance storage and server options, reduced deployment times, and increased data and application security. Constructed using proven, well-recognized members of the market-leading IBM Spectrum Storage family of software-defined storage solutions, IBM Storage Solutions for IBM Blockchain can help your business safely, securely and cost-efficiently make blockchain technology your own competitive advantage.
Blockchain basics

A blockchain is a tamper-proof, shared digital ledger that records transactions in a public or private peer-to-peer network which is often called a “hyperledger.” Distributed to all participants or member nodes in the network, the ledger permanently records, in blocks of information, the history of asset exchanges that take place between the peers in the network. All the confirmed and validated transaction blocks are linked and chained, from the beginning of the chain to the most current block—hence the name blockchain. This architecture makes the blockchain essentially tamper-proof. It thus acts as a single source of truth.

Industry analysts predict that the blockchain market is already growing at an astounding 82 percent and will reach nearly USD10 billion by 2021. Using blockchain-based hyperledgers, businesses can save time and costs while reducing risks. Blockchain technologies promise improved transparency among willing participants, automation, ledger customization and improved trust in record keeping.

But implementing blockchain solutions brings certain challenges. For example, there currently exists no method to prune or archive the hyperledger. Because of this and other reasons, such as new governmental regulations, it is important to store larger files and sensitive information in what is called “off-chain” storage, which can be on-premises or in the public cloud.

*IBM Hyperledger Fabric unites best-of-breed blockchain tools, enabling simple deployment of blockchain networks backed by proven hardware and methodology.*
Because of the extreme growth rates in these environments, and the challenges of coordinating off-chain and on-chain systems, the underlying IT infrastructure supporting blockchain implementations must meet key requirements for security, availability, system performance and scalability:

- **Security:** Each participant or node in a blockchain implementation must employ effective data encryption and user authentication to ensure the integrity of their contributions to the blockchain.
- **Availability:** Blockchain solutions are only as useful as they are available. To maintain user confidence and value, each node must utilize infrastructure that ensures very high availability.
- **Performance:** As blockchains grow, low-latency/high-performance storage becomes more and more necessary in order to handle the increasing data traffic generated by hundreds, perhaps thousands, of concurrent users—all accessing transaction records and utilizing smart contracts.
- **Scalability:** Both capacity and performance requirements increase as blockchains naturally grow; therefore, IT infrastructure must be able to scale as needed.

To meet such challenging requirements, enterprises considering blockchain deployments are turning to powerful new end-to-end alternatives such as IBM Storage Solutions for IBM Blockchain.

**IBM Storage Solutions for IBM Blockchain**

IBM Storage Solutions is a line of all-in-one offerings recently introduced by IBM Storage. IBM has been rapidly adding new solutions designed to address the most pressing real-world business challenges, while at the same time increasing the breadth and depth of existing solutions. Offerings in the IBM Storage Solutions line are driven by pre-tested and validated blueprints designed to make deployment of these leading-edge solutions easier, faster and lower risk. They include storage capacity, hardware, software infrastructure and servers, plus deployment support, detailed configuration documentation and best practices advice.
IBM Blockchain solutions take advantage of a complete infrastructure encompassing storage, enterprise computing power, IBM Hyperledger fabric, IBM Cloud and expert support.

Recently, IBM has announced a new offering called IBM Storage Solutions for IBM Blockchain. These are easy to deploy solutions that bring together the hardware and software components needed to set up or expand blockchain environments. Each of the IBM Storage Solutions for IBM Blockchain comes with data management capabilities to simplify deployments using validated blueprints. They are engineered for enterprises with multicloud needs and are deployed on-premises with easy-to-consume components built to perform and scale for any blockchain requirement.

IBM Storage Solutions for IBM Blockchain incorporates elements from across the IBM Storage portfolio, including hardware and software components, ordering and installation instructions and support, and several different expansion options. Pre-tested blueprints tie each solution together with a set of instructions defining each component and providing configuration details. Plus, IBM subject matter experts are available to help you through your installation and setup journey.

**Key solution components**

Each of the full-stack multicloud IBM Storage Solutions for IBM Blockchain contains server and storage options; connectivity to distributed, remote or IBM Cloud platforms; networking components; comprehensive support from IBM and our partners; a range of expansion choices; and even various advantageous payment options—but certain members of the IBM Storage portfolio play key roles.
IBM FlashSystem 9100

Every blockchain implementation must have high-performance, highly scalable, secure and easily accessible on-chain data storage. Off-chain storage will almost certainly be required as well. IBM Storage Solutions for IBM Blockchain allows you to leverage your existing storage assets, but you can also incorporate powerful IBM storage systems that can perform as the sole storage solution or easily integrate with existing systems. IBM FlashSystem 9100 offers a remarkable choice for this key role.

IBM FlashSystem 9100 delivers the sophisticated features of IBM Spectrum Virtualize, including encryption, high-availability capabilities, and cost-efficient data reduction.

IBM FlashSystem 9100 combines the performance of flash and Non-Volatile Memory Express (NVMe) protocol with the reliability and innovation of IBM FlashCore technology and the rich feature set of IBM Spectrum Virtualize. The systems provide ultra-low latency, industry-leading encryption and high availability features, powerful data reduction technologies to lower capacity requirements and storage costs, and easy scalability into the multi-petabyte range. Most importantly for blockchain projects, IBM FlashSystem 9100 leverages the data management, multicloud connectivity and virtualization capabilities of IBM Spectrum Virtualize software to enable consolidation of both existing and newly deployed storage assets into a single storage domain managed from one pane of glass.

IBM Spectrum Virtualize

Storage virtualization is a powerful technology that can consolidate and simplify complex blockchain storage environments. IBM Spectrum Virtualize is a proven, award-winning member of the IBM Spectrum Storage family of software-defined storage solutions that can extend its wide range of data management features to over 440 heterogeneous systems, creating a single blockchain storage resource for both on-chain and off-chain requirements. With IBM Spectrum Virtualize, existing storage assets, various public cloud resources and new systems can be
added, retired, re-vitalized with new functionality, and/or repurposed to meet evolving business and infrastructure objectives. Data can be automatically tiered to optimize performance or cost priorities, transparently moved from system to system, encrypted and replicated—even if this functionality was not native to the original systems—and all easily managed as a single highly flexible resource.

**IBM Spectrum Scale**

The majority of the information contained in blockchain implementations will be unstructured data in the form of files, contracts, documents, emails and even images. The various participants in any particular blockchain solution may be distributed around the globe, but all require immediate, low-latency access to shared data. And data growth will almost certainly be explosive. A complex mix of technologies and products might be integrated through much trial and error to form a high-risk but workable solution to these requirements—or you can simply deploy IBM Spectrum Scale.

IBM Spectrum Scale provides a full-featured set of file data management tools, including advanced storage virtualization, integrated high availability, automated tiered storage management, and high-performance configurations to effectively manage large quantities of file data. It is designed to support a wide range of application workloads using a variety of access protocols and has been proven extremely effective in large, demanding environments. IBM Spectrum Scale brings powerful solutions to many of the unstructured data challenges found in blockchain implementations.

**IBM Cloud Object Storage**

In most blockchain implementations, the vast majority of data will be supporting information stored off-chain. This will be unstructured data rarely accessed—the perfect use case for cloud-based object storage. IBM Cloud Object Storage provides flexible, cost-effective and scalable cloud storage for unstructured data.

IBM Cloud Object Storage makes it possible to store practically limitless amounts of data, simply and cost-effectively. It is commonly used for data archiving and backup, web and mobile applications, and as scalable, persistent storage for analytics. Now, it’s a foundational component for many IBM Storage Solutions for IBM Blockchain offerings. Flexible storage-class tiers with a policy-based archive let you effectively manage costs while meeting data access needs. Immutable object storage technology helps blockchain participants preserve records and maintain data integrity in a WORM (write-once, read-many), non-erasable and non-rewritable manner to protect against deletion or modification. And IBM Cloud Object Storage offers unmatched flexibility of deployment—on-premises, hybrid cloud, dedicated cloud or public cloud.
IBM Spectrum Protect Plus

Data protection is a key concern in blockchain environments, especially in off-chain storage systems. As the data centers where off-chain systems reside leverage the latest virtualization technologies, including containers, and shift away from manual tasks and toward automation, simplicity and agility, IBM Spectrum Protect Plus becomes a key element in the overall data protection strategy. IBM Spectrum Protect Plus takes a modern approach to data protection by focusing on operational recovery and reuse of data rather than being only a backup solution.

IBM Spectrum Protect Plus protects virtual environments, specifically VMware ESXi and Microsoft Hyper-V. It also supports file and database recovery, as well as multi-site data replication for disaster recovery. IBM Spectrum Protect Plus data copies can be repurposed for multiple data copy use cases, such as provisioning application development/test environments and supporting analytics and reporting. The software can be up and running in less than an hour, compared to some alternatives that may take weeks to deploy and require costly professional services.

IBM Spectrum Copy Data Management

And speaking of managing and repurposing copies originally created for data protection purposes, blockchain implementations become, by nature, very active application development environments. Participants derive value from their blockchain solutions by developing and deploying applications that enable new revenue streams and blockchain use cases. Application development and test teams require rapid, easy access to appropriate production data sets, and this is where IBM Spectrum Copy Data Management plays an especially valuable role.

Traditional approaches to data protection can result in dozens of data copies created and stored throughout the IT environment, including the primary instance and the various backups, snapshots, replicas and database dumps. IBM Spectrum Copy Data Management enables blockchain participants to significantly improve overall data economics by creating efficient storage environments. Its suite of services helps enterprises track, create, refresh and manage the use of data copies. These same common services can be applied to many different use cases within the data center, including disaster recovery, application development and testing, analytics, and archiving within blockchain environments. Using these common services across multiple use cases enables administrators to catalog and better manage the overall data environment, lowering both cost and complexity.
Benefits from a market leader

IBM Storage Solutions for IBM Blockchain offers many benefits to enterprises looking to set up or enhance their blockchain infrastructure. These pre-tested and validated storage solutions help you:

- Improve both on- and off-chain data resiliency with enterprise-proven NVMe-based IBM FlashSystem 9100 and powerful host-side options such as new IBM LinuxONE Rockhopper II servers
- Reduce on/off-chain test/dev and deployment times while improving time to new profits from days to hours
- Increase blockchain security with 100 percent application and data end-to-end encryption support
- Ensure you meet and/or exceed blockchain peer-to-peer network performance requirements with up to 10 million input/output operations per second (IOPS) and 136 GB/sec of NVMe-accelerated on- and off-chain storage

Key solution benefits include:

- **Rapid deployment**: IBM Storage Solutions for IBM Blockchain delivers a complete compute to storage stack, open and flexible to meet your most demanding blockchain requirements. The solutions are Hyperledger fabric-ready and incorporate pre-tested and validated blueprints to simplify and accelerate solution deployment. They are optimized for the entire on- and off-chain environment, with NVMe-based technology and services.
- **Hybrid multicloud capabilities**: IBM Storage Solutions for IBM Blockchain provides secure access to multiple public cloud services. They are open, Kubernetes-based container platforms.
- **Peace of mind**: The solutions provide leading-edge data security from creation to archive. They reduce blockchain infrastructure complexity to help you commercialize networks, unlock new value and scale up to create competitive advantages. They can also lower business risk through the IBM FlashWatch and Data Reduction Guarantees, Controller Upgrade Program, High Availability Guarantee, and built-in data migration.
- **CapEx to OpEx advantages**: IBM Storage Solutions for IBM Blockchain helps you move from capital to operational cost models by offering multiple pay-as-you-go options, including the popular IBM Storage Utility Offering.
Business success

Blockchain is coming. The only question is—How will you take advantage of this remarkable new technology? Will your company be the disruptor by bringing new technologies such as blockchain into the marketplace and thus gaining competitive advantage? Or will you be one of those disrupted by change? IBM Storage offers proven infrastructure solutions that lower deployment risks and costs, while simplifying operations and expansion. IBM Storage Solutions for IBM Blockchain may offer the advantages and benefits you need to turn a brand-new technology into good old-fashioned business success.


3 IBM Blockchain https://www.ibm.com/blockchain


Why IBM?

A dedication to open standards and emerging technologies, coupled with high-performance hardware and a broad portfolio of proven software and support, allows IBM to deliver cost-effective, comprehensive storage solutions. With nearly one hundred years of innovation in meeting the technology and business needs of clients all over the world, IBM continues to demonstrate market leadership in advanced networking and data techniques. In addition, IBM delivers some of the best storage products, technologies, services and solutions in the industry without the complexity of dealing with different hardware and software vendors.

For more information

To learn more about IBM Blockchain solutions or about the IBM Blockchain please contact your IBM representative or IBM Business Partner, or visit: https://www.ibm.com/blockchain