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	(71)**Name of Applicant :**
	  1)**CMR Institute of Technology**
	    Address of Applicant :KANDLAKOYA VILLAGE, MEDCHAL MANDAL, R. R DISTRICT, HYDERABAD 501401 TELANGANA, INDIA Hyderabad ----------- -----------
	   2)**CMR COLLEGE OF ENGINEERING & TECHNOLOGY**
	   3)**CMR TECHNICAL CAMPUS**
	 Name of Applicant : NA
	 Address of Applicant : NA
	 (72)**Name of Inventor :**
	  1)**Dr M.Srirama Lakshmi Reddy**
	 Address of Applicant :Associate Professor, Computer Science and Engineering, CMR Institute of Technology, Kandlakoya, Medchal, Hyderabad, Telangana, India. 501401., Hyderabad ----------- -----------
	  2)**Mr Shaik Md Ashraf Ali**
	 Address of Applicant :Assistant Professor, Computer Science and Engineering, CMR Institute of Technology, Kandlakoya, Medchal, Hyderabad, Telangana, India. 501401., Hyderabad ----------- -----------
	  3)**Mrs B.Sandhya Rani**
	 Address of Applicant :Assistant Professor, Computer Science and Engineering, CMR Institute of Technology, Kandlakoya, Medchal, Hyderabad, Telangana, India. 501401., Hyderabad ----------- -----------
	  4)**Mrs. Mounika Rajeswari Adabala**
	 Address of Applicant :Assistant Professor, Computer Science and Engineering, CMR College of Engineering & Technology Hyderabad ----------- -----------
	  5)**Mrs. Kamala Mekala**
	 Address of Applicant :Associate Professor, Computer Science and Engineering, CMR College of Engineering & Technology Hyderabad ----------- -----------
	  6)**Mrs.P Sravanthi**
	 Address of Applicant :Assistant Professor, Computer Science and Engineering, CMR College of Engineering & Technology Hyderabad ----------- -----------
	  7)**Dr. J. Narasimharao**
	 Address of Applicant :Assoc. Prof., Computer Science and Engineering, CMR Technical Campus Hyderabad ----------- -----------
	  8)**K Biksheswar Rao**
	 Address of Applicant :Asst. Prof., Computer Science and Engineering, CMR Technical Campus Hyderabad ----------- -----------

(57) Abstract :

MULTI-LAYERED BLOCKCHAIN-DRIVEN SECURE DATA SHARING PROTOCOL WITH ZERO-KNOWLEDGE PROOFS FOR DISTRIBUTED NETWORKS ABSTRACT The disclosed system (100) provides a secure data sharing solution for distributed networks using a multi-layered blockchain architecture (102). Each blockchain layer is tailored to manage specific types of data or transactions, with customized security and access controls. A zero-knowledge proof module (104) is integrated into the blockchain to validate transactions without revealing underlying data, thereby ensuring privacy and data integrity. The system includes a node communication interface (106) that supports secure, encrypted transmission between nodes, enabling both peer-to-peer and multi-node transactions. A consensus engine (108), employing a hybrid of proof-of-work (PoW), proof-of-stake (PoS), and Byzantine fault tolerance (BFT) mechanisms, ensures robust and tamper-resistant consensus across the network. Additionally, a data integrity verification module (110) continuously monitors and checks the integrity of data within the blockchain layers using cryptographic hash functions to detect any unauthorized modifications. This system offers enhanced security, privacy, and reliability for distributed data sharing applications. FIG. 1

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