

The Blossoming of the Blockchain

THERE WILL BE A BLOCKCHAIN IN YOUR FUTURE, WHETHER YOU LIKE IT OR NOT

Blockchain

WHEN BITCOIN WAS unleashed on the world eight years ago, it filled a specific need, for a digital currency that wasn't under anybody's control. But it wasn't long before people realized the technology behind Bitcoin—the blockchain—could do much more than record monetary transactions. • That realization has lately blossomed into a dazzling and often bewildering array of startup companies, initiatives, corporate alliances, and research projects. Collectively, they're facing a question that will have an enormous impact: What can the blockchain do better than conventional databases? Billions of dollars will hinge on the answer in the next several years. • Can the technology link neighborhood buyers and sellers of rooftop-generated solar electricity? Can it keep track of property titles, academic transcripts, energy market credits, and state licenses for health care providers? Can it check the status of airline flights—and make reparations to weary travelers if their flights are delayed? We'll soon see: All of those proposals have been embodied

in blockchain-based agreements called smart contracts, which are being tested right now. • The schemes aren't limited to startup-level experiments, either. Remember credit-default swaps? Those financial instruments that nearly crashed the global economy a decade ago? The world's biggest clearinghouse for these contracts thinks it can make them more secure by switching them to a blockchain-like system in 2018. If the plan works, US \$11 trillion will be moving through this system every year. • The future may belong to smart contracts, but for now Bitcoin is still the biggest user of blockchain technology, and it's a major driver of innovation in computing hardware. Most of that computing is dedicated to mining—the process that runs the network and rewards those who do the work with newly minted bitcoins. That computing is done on purpose-built machines packed with custom chips. To describe it firsthand, *IEEE Spectrum* sent a reporter to the "mines" of Inner Mongolia, where one of the world's

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largest concentrations of powerful computers makes millions for its owners. • These mines have been built in the parched sands of Mongolia for one reason: cheap electricity. Each day, Bitcoin slurps a city's-worth of energy to perform a small fraction of the transactions that major credit card networks accomplish. But there are other ways to run a cryptocurrency, and Intel thinks it's found one. Not coincidentally, the technique hinges on the proprietary workings of its own processors. • Enthusiasts are sure that blockchain tech is going to take over the world. To realists it could be the solution to a few important problems. Regardless of who's right, there are going to be blockchains in your life. Whether they're in the background or the foreground, you should understand how they'll work, and what could happen if they don't.

—Morgan E. Peck & Samuel K. Moore