neuroware

BEYOND THE FINANCIAL BOUNDARIES OF BLOCKCHAINS

BLOCKCHAINS & DISTRIBUTED LEDGER TECHNOLOGY

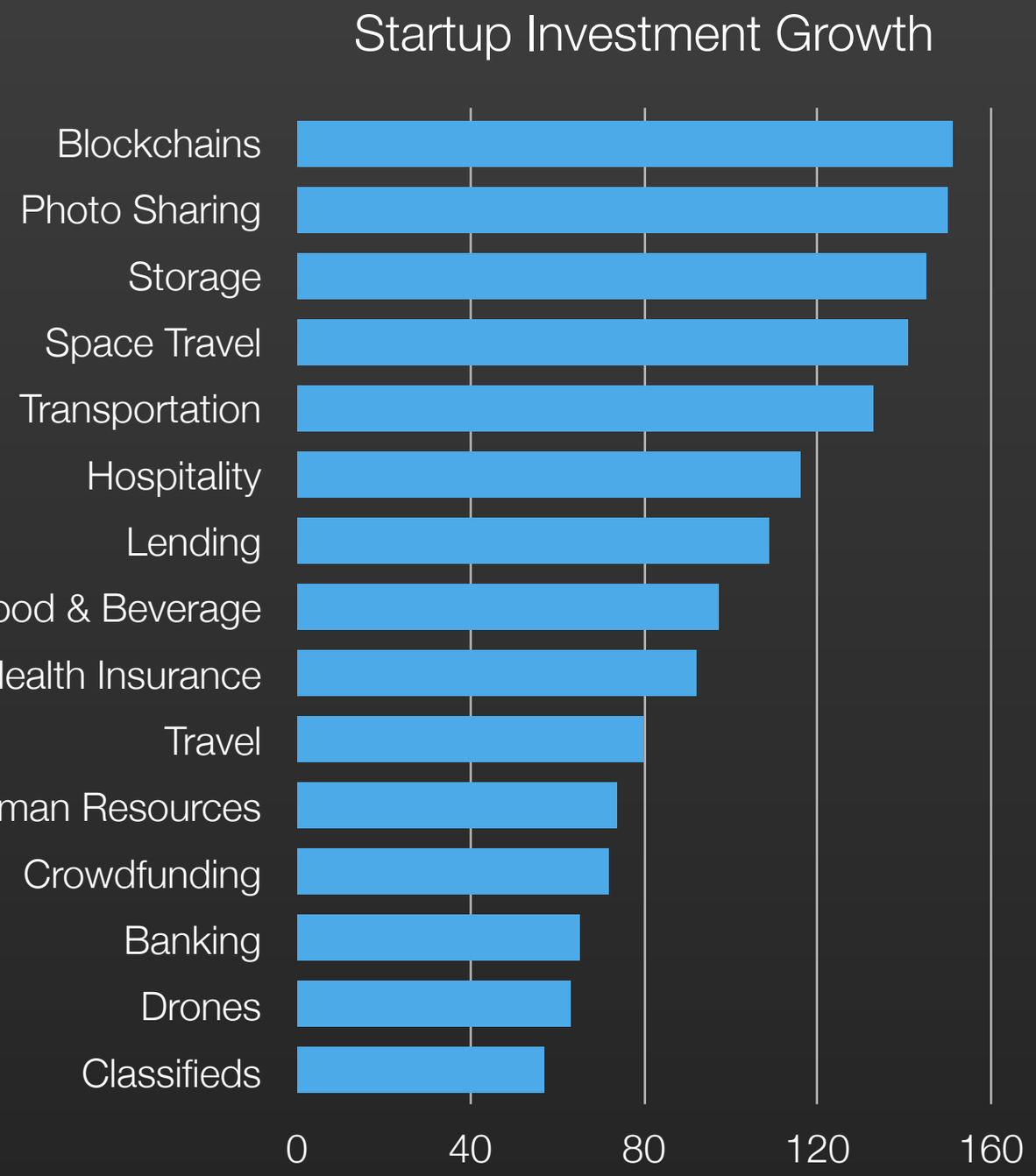
"A blockchain is a shared ledger of all transactions that have ever been executed. It is constantly growing as verified blocks containing new transactions are added to it. Blocks are automatically added to the blockchain in a linear, chronological order and secured by cryptography to provide a transparent and tamper proof history."

Set to help revolutionize old processes and create entirely new services, these new technologies provide significant benefits over centralized data stores:

- Fraud & error prevention
- Reduced CapEx
- Automated auditing
- Cryptographically secure
- Independently verifiable
- Less vulnerable to attack
- Easy data sharing between partners
- Increased transparency of data

IT'S THE FASTEST GROWING TECHNOLOGY EVER CREATED

- Bitcoin was the first application built using distributed ledger technology.
- Also known as blockchains, distributed ledger technology enables an entirely new form of application development.
- Distributed applications are being developed by organizations such as IBM, NASDAQ, CitiBank, Goldman Sachs, Santander, DBS, and more.
- The last time this much capital and effort was put into creating a decentralized network - ***the Internet was created***. Bill Gates, Reid Hoffman, and Sir Richard Branson believe it is the most important technological advancement since then.



A TECHNOLOGY STARTUP FOUNDED BY TECHNOLOGISTS

Mark Smalley - CEO

Mark's been building distributed applications on the blockchains for over 5 years now from Malaysia, where he's been developing web-applications for 19 years & helping to organize and present at several prominent technology groups and conferences worldwide. He was also the first qualified MongoDB Master in Asia, where he won an award for his open-source NoSQL Content Management System.

Ruben Tan - CTO

Ruben is one of Malaysia's leading NodeJS developers, founding member of the Malaysian JS User-Group, and regular contributor to many open-source projects and communities; having explored distributed consensus technologies and NoSQL data relationships with previous projects such as MyTeksi and OnApp - he has spent a decade mentoring startups and businesses worldwide.

WE ARE BACKED BY A TRUSTED TEAM OF VESTED ADVISORS

Colin Charles
MariaDB Founder

Adam Giles
Ex Standard Chartered

Hanson Goh
Axiata / Ex Google

David Barton Grimley
Sapient Nitro

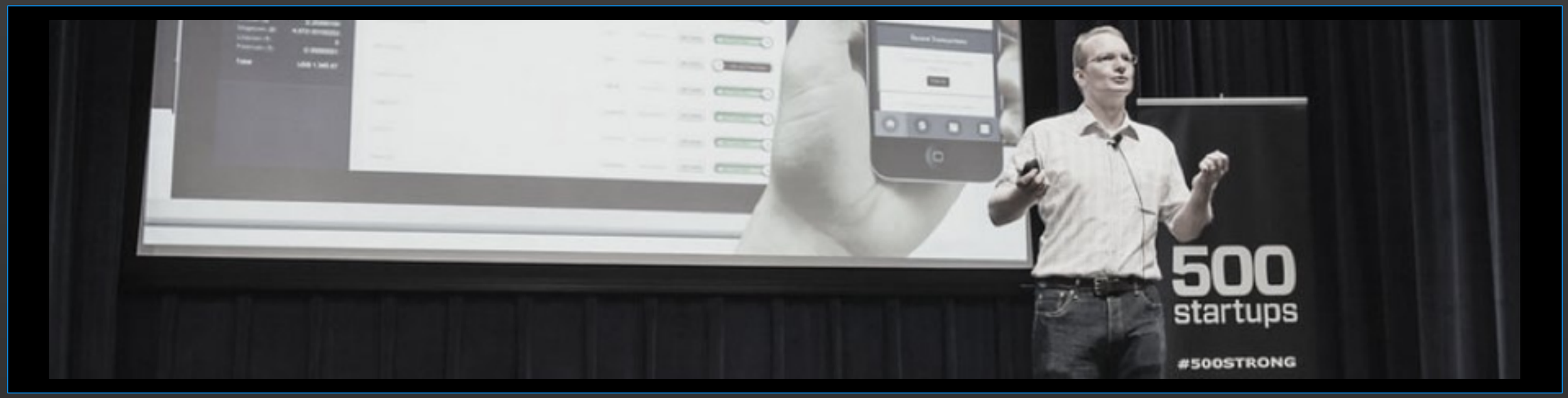
Johnny Mayo
Forbes 30 Under 30

Wu Han Ngeow
Maxis

Gabey Goh
Campaign Asia-Pacific

Gareth Davies
Mindvalley

WE ARE EXPERIENCED INNOVATORS IN AN EARLY ECOSYSTEM



- 1st Malaysian Company to Graduate from 500 Startups in Mountain View
- 1st Company in Asia Providing Public Blockchain APIs & Developer Toolkits
- 1st in The World to Develop Non-Financial Blockchain Agnostic Protocols
- Helped Organize World's 1st Bank-Backed Blockchain Hackathon (DBS)
- **Only VC-Backed Blockchain Consultants in South East Asia**

WE CREATE CUSTOMIZED BLOCKCHAIN EXPERIENCES

- Enterprise solutions can be licensed to use on premise
- We help integrate our protocols with existing legacy systems
- We create custom modules that extend the functionality of our protocols
- We conceptualize new products and services that utilize our protocols
- We provide training and ideation sessions to institutions to help them understand and benefit from blockchain technologies

AND SOLVE LARGE DISTRIBUTED DATA PROBLEMS

- Most of the funding and innovation is taking place within closed silos that are creating new blockchains or entirely dependent only one chain
- Communication between different blockchains is nonexistent
- Public keys are difficult to remember and cannot be revoked
- Generating and or securing private keys can be challenging
- Verifying users and authenticating decentralized access is difficult
- Storing large amounts of structured data is incredibly complex
- Setting-up and configuring infrastructure can be time consuming
- Our industry has few experts that organizations can call upon…

OUR TECHNOLOGY ENABLES NEW OPPORTUNITIES

BANKING

From AML & KYC cost reductions to reward schemes & reaching the unbanked or general key-signing

HEALTHCARE

Complete and immutable family histories of every related diagnosis and condition available from one key

ACCOUNTING

Creation of programmable processes and automated auditing trails that increase transparency and efficiency

LEGAL

Cryptographically secure document notarization, copyright protection, and dispute settlement

GOVERNANCE

Increase the accountability of public officials and offer total transparency in voting and elections

LOGISTICS

Tracking of shipping cycles and provenance systems that autonomously verify actions

GAMING

Share digital assets between an entire network of games, or use the blockchains to create immutable persistent open-worlds

ASSETS

Track possession of your property in the digital economy by creating, managing, storing, or sharing multiple asset classes

INSURANCE

Integrated insurance and medical services can be intelligently designed to quickly and contractually settle claims with cryptographically

OUR PROTOCOLS ARE UNIQUE IN THE ECOSYSTEM

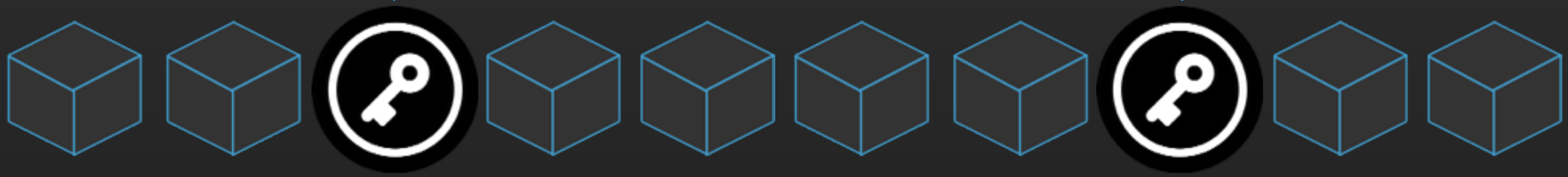
- We developed and maintain the following blockchain agnostic protocols:
  - **DNKey** - Cryptographic Key Management
  - **BlockAuth** - Identity & Authentication
  - **Everstore** - Distributed Structured Data Storage
- They form the foundations for non-financial distributed applications
- **‘CORTEX’** is our integrated development environment unifying these protocols
- We have a wealth of experience in setting up blockchain infrastructure
- We’re working with institutions and regulators to integrate these solutions

DNKEY - ROBUST CRYPTOGRAPHIC KEY MANAGEMENT

- Scalable key logistics across multiple platforms, applications, and processes
- Enables DNS style abstraction for key retirement, replacement, and rotation
- Decodes memorable, trustworthy domain names to pubic cryptographic keys

dnkey

Abstracting the complexities of cryptographic key management



HOW WE ABSTRACT THE COMPLEXITIES OF KEY MANAGEMENT

- Transform wallet addresses from complicated public keys such as: 13aaehx6p4QrTHMvQUZy3dTEevXr4Wprap into something much more memorable and manageable - such as **mark.neuroware.io**
- Services configured to read DNKeys (rather than direct public keys) can programmatically control keys remotely
- Ensures organizations have total control over key management and are not locked-in to any one vendor or blockchain
- High-level domains can be used as a way to control your distributed on-chain presence across multiple applications

BLOCKAUTH - IDENTITY MANAGEMENT & AUTHENTICATION

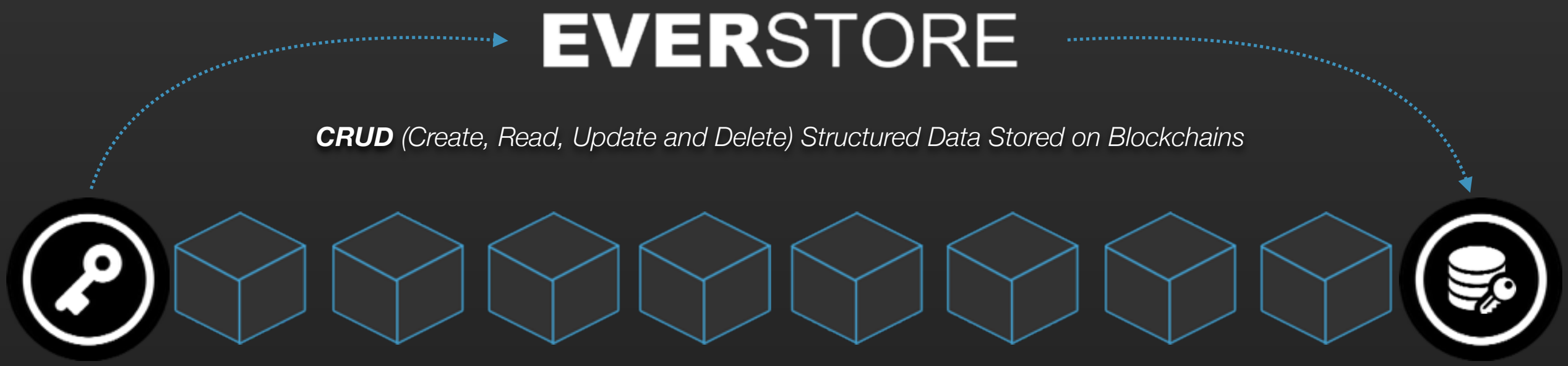
- Enables intelligent account authentication via cryptographic keys
- Private keys replace passwords whilst the public keys becomes an identity
- Applications and organizations can independently authenticate credentials

HOW WE ENABLE DISTRIBUTED AUTHENTICATION

- Allows applications without a central server to authenticate users
- Removes the need for internal storage and helps minimize risk
- Scalable identity management from simple site logins to verifying distributed teams with varying levels of administrative control
- We also provide on-premise enterprise solutions for additional functionality such as integrated SMS for 2FA

EVERSTORE - THE FIRST BLOCKCHAIN POWERED DATABASE

- Everstore is the first protocol capable of storing large amounts of structured data directly on a blockchain - bypassing singular transaction limitations
- Replicates full CRUD-like functionality with schemas, indexes & relationships
- Data encoded via an Everstore instance is available for the life of the ledger



CURRENT BLOCKCHAIN DATA STORAGE ATTEMPTS

- Most well known in the ecosystem are Factorm.org and Tierion.com
- Both store checksums or ‘receipts’ on a blockchain in an OP_RETURN
- Records notarized on the blockchain must fit within Bitcoin’s 38 byte limit
- References then link to the actual data which is stored somewhere off-chain
- Other solutions such as StoreJ and Filecoin are attempting to build dedicated blockchains from the ground up specifically for just storing data and files
- The concern from the technical community is that without an underlying token of value or properly incentivized network security will suffer

CURRENT BLOCKCHAIN DATA STORAGE ATTEMPTS

Pros

- Timestamped with proof of ownership
- Verifiable entry of records backed by the blockchain

Cons

- Data is not secured by the blockchain - just mentioned on it
- Data can still be edited externally without an independently verifiable audit trail
- Trusting a 3rd party to store your data and records introduces many risks
- Same risks as centralized servers - potential for data loss, hacking, etc
- Byte limit prevents structured linking of data

WHY EVERSTORE IS SO SPECIAL

- Using a ‘master key’ Everstore can map transaction-outputs intelligently
- This allows Everstore to bypass the 38 byte limit with structured linking
- Data can be directly encoded on a blockchain - making it the database itself
- Each Everstore instance can hold up to 999,999,999 tables each with up-to 999,999,999 fields, with unlimited records, indexes and relationships
- Already supports over 15 field types from simple strings and numbers to more complex arrays and objects such as dates and geo-coordinates
- Private keys allow updates whilst public keys provide read-only access

WHY EVERSTORE IS SO SPECIAL

Pros

- Use the blockchains to store structured data over just transactional data
- Replicates full CRUD database functionality (Create, Read, Update, Delete)
- Everstore can encode multiple fields, indexes, schemas, and data types
- Built in fully automated audit trail tracking every change ever made
- Lifetime distributed and redundant hosting for a single one-time encoding fee

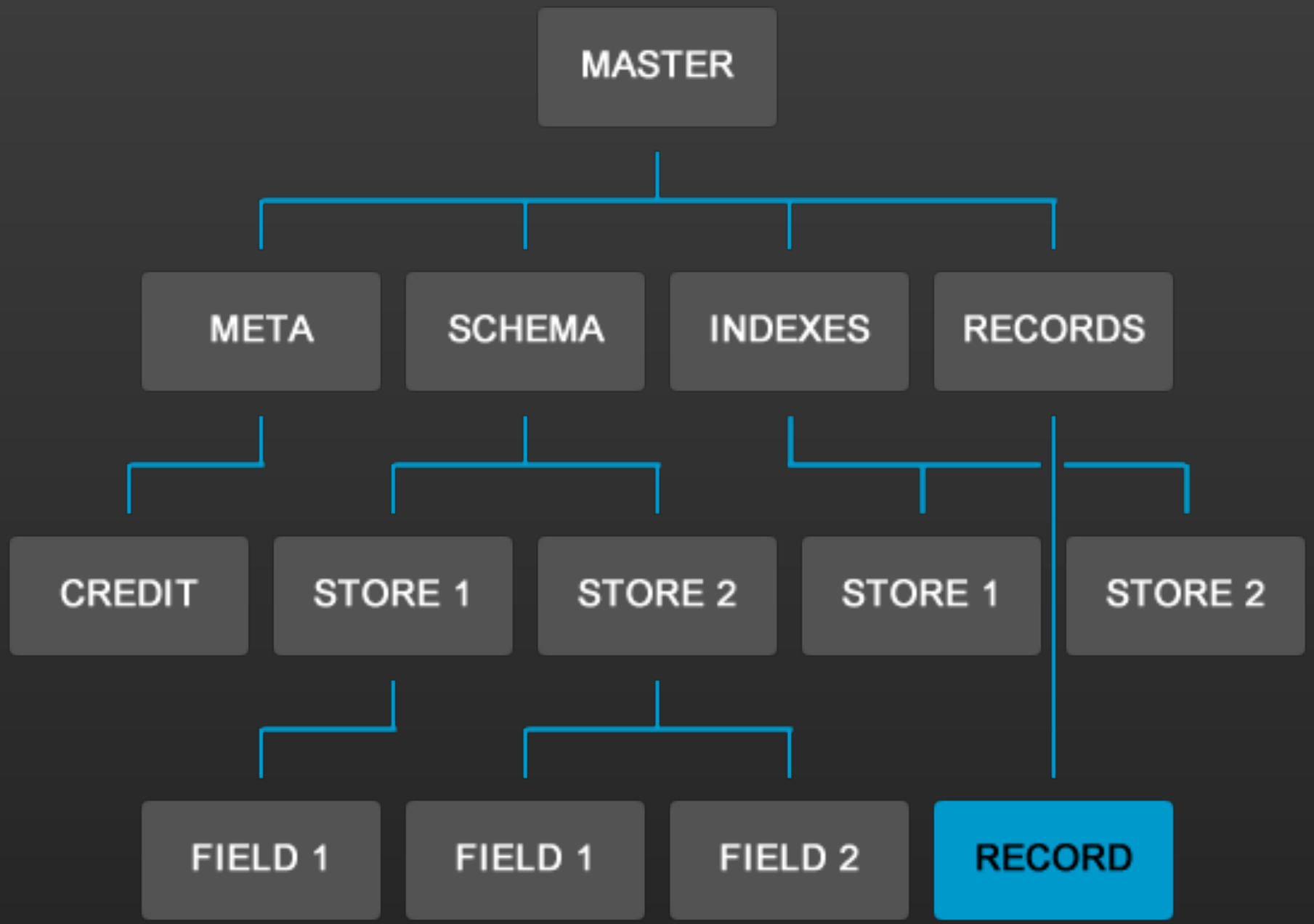
Cons

- It can be slow if accessing the protocol directly without hosted caching

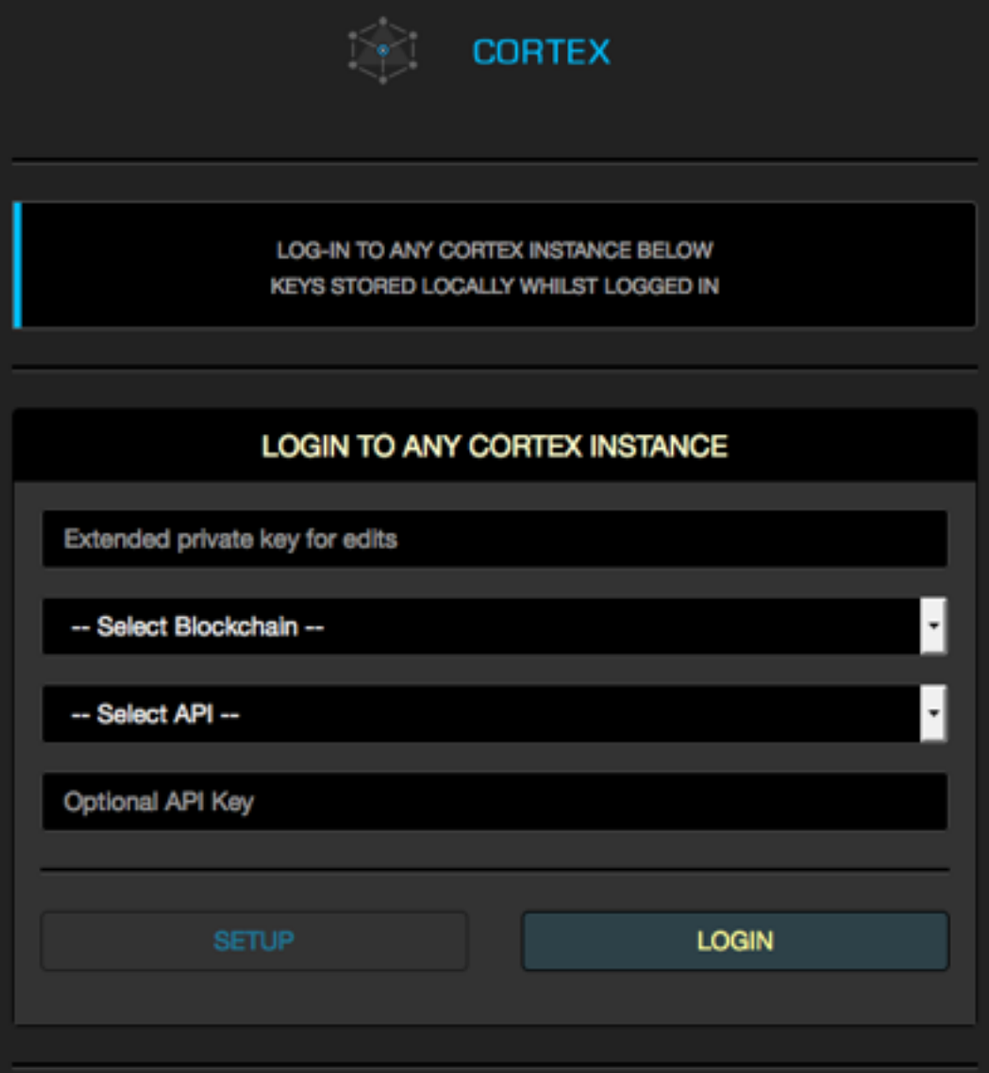
WHY EVERSTORE IS SO SPECIAL

- Data is public by default but can also be stored privately with encryption too
- Blockchain agnostic protocol so data can be easily exported between chains
- Works as a standalone protocol or in conjunction with other protocols
- Easy integration with Everstore driven data for third-party applications
- Can utilize DNKey for easily sharing databases (such as db.neuroware.io)
- Can be integrated with BlockAuth to track which users are updating data
- Includes an integrated interface for managing data and caching locally
- Does not suffer from storage, API provider lock-in, or any third-party conflicts
- Can also be operated within a server-less environment

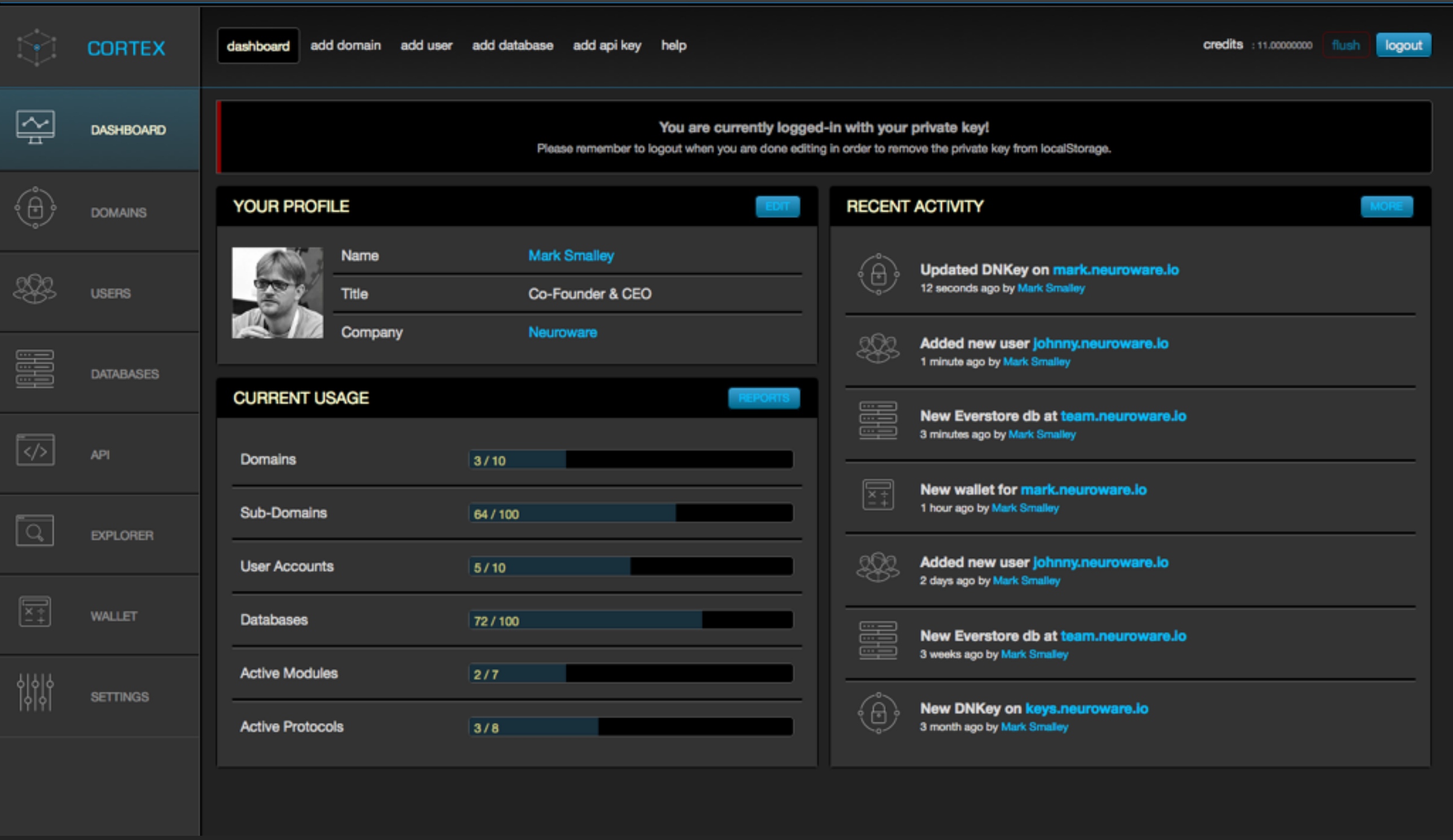
AN ABSTRACT VIEW OF EVERSTORE HIERARCHAL DATA STORAGE



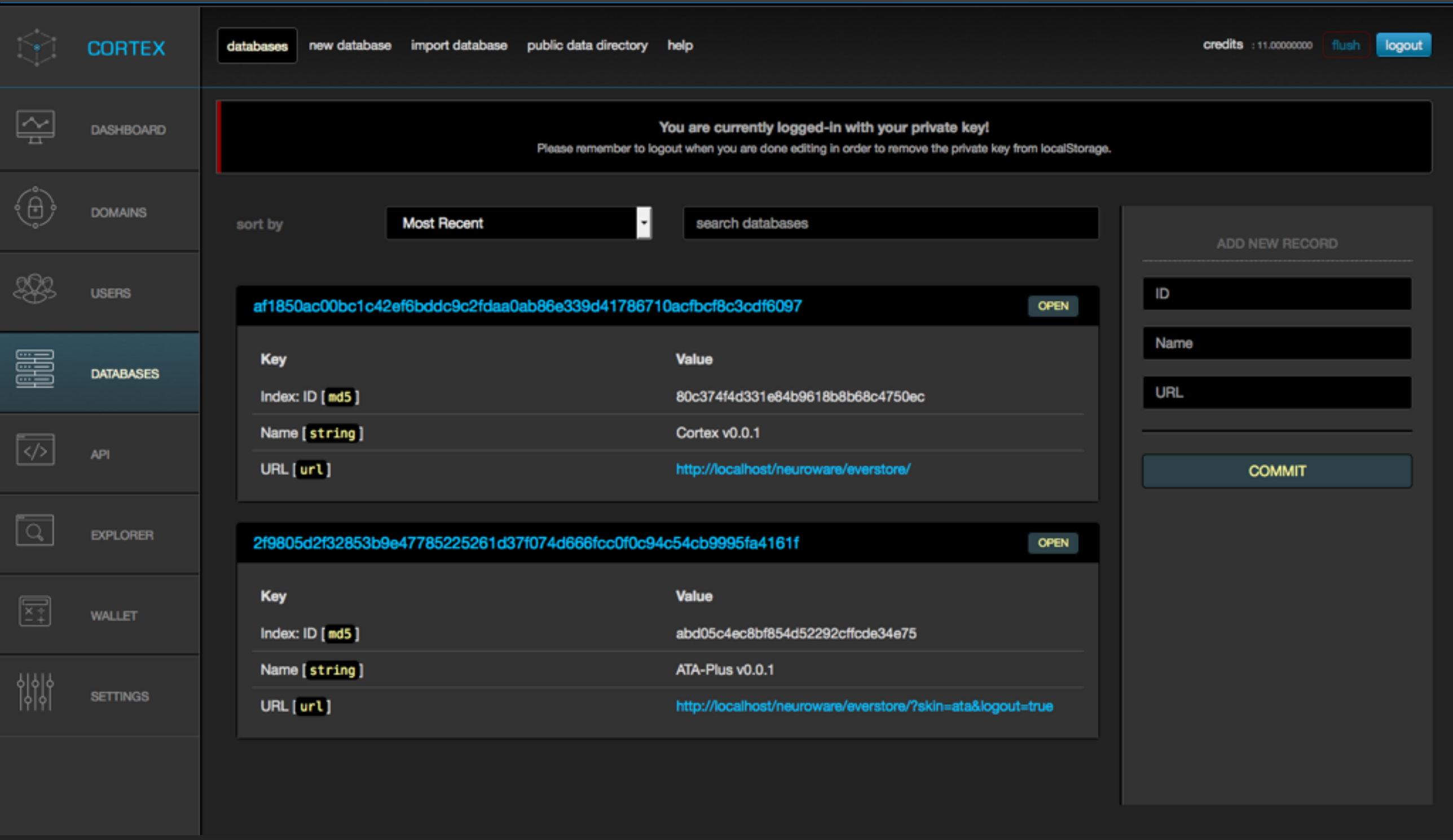
USE EVERSTORE TO LOGIN TO ANY BLOCKCHAIN USING HTML5



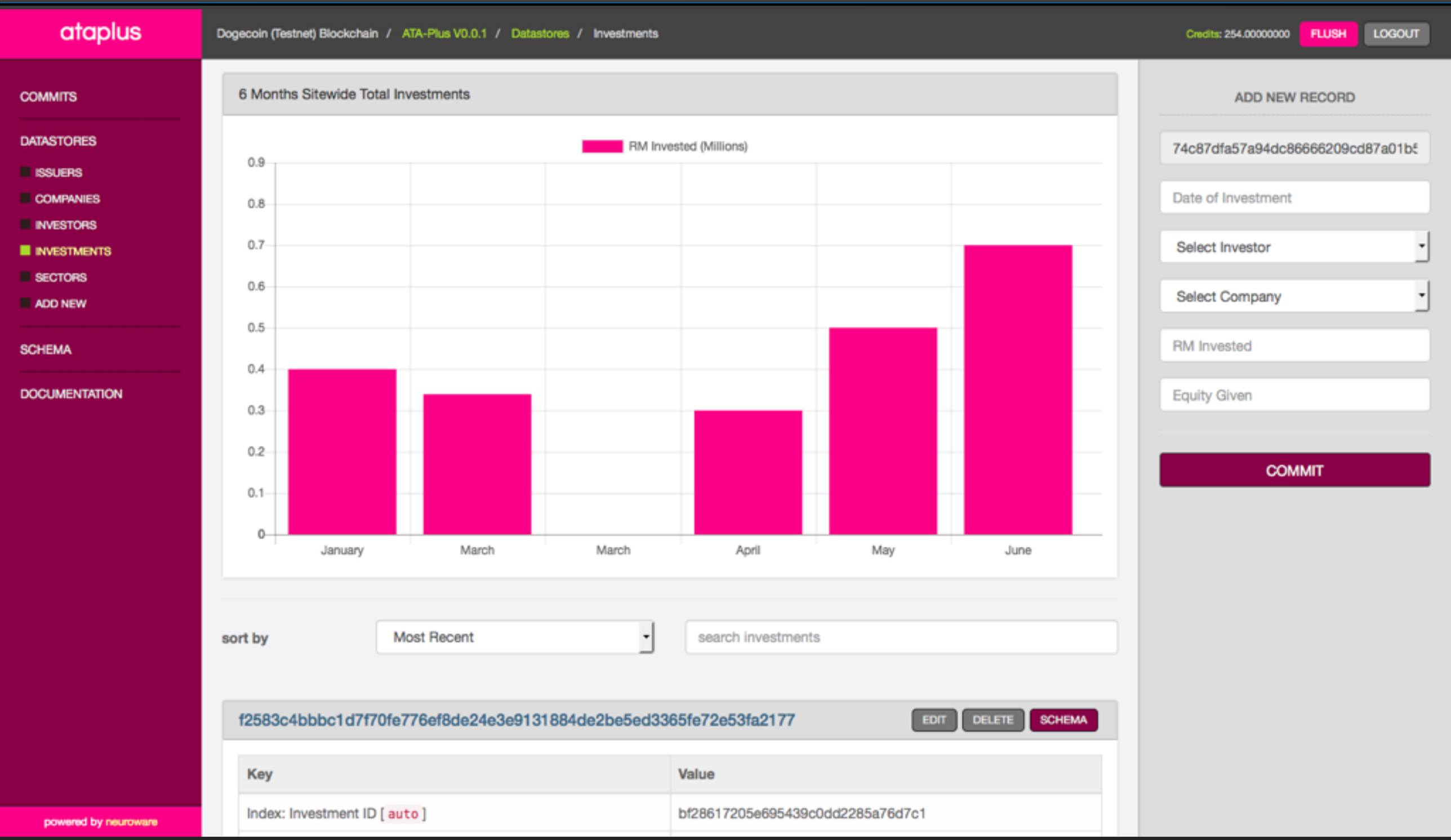
WITH CORTEX AS A SERVERLESS INTERFACE FOR BLOCKCHAINS



CREATE AND MANAGE MULTIPLE BLOCKCHAIN DATABASES



EASILY CUSTOMISED THROUGH MODULAR THEMES AND PLUGINS



CORTEX ALSO INCLUDES AN OPTIONAL API & DOCUMENTATION

CORTEX

DASHBOARD

DOMAINS

USERS

DATABASES

API

EXPLORER

WALLET

SETTINGS

api docs | console

credits : 11.00000000 | flush | logout

You are currently logged-in with your private key!

Please remember to logout when you are done editing in order to remove the private key from localStorage.

CortexJS | Raw API Requests | Everstore API | BlockAuth API

Search | SEARCH

api.blocks.latest(<chain>, <count>, <callback>)

This function calls upon `spinal.neuroware.io/<chain>/blocks/latest/<count>`

The `count` variable defines how many of the latest blocks to return.

The `callback` function is called upon completing the AJAX request.

```
api.blocks.latest('btc', 5, function(blocks)
{
    console.log(blocks);
});
```

api.blocks.get(<chain>, <ids>, <callback>)

This function calls upon `spinal.neuroware.io/<chain>/block/id/<ids>`

The `ids` variable defines which blocks to return and can be a string or an array.

The `callback` function is called upon completing the AJAX request.

```
var block_ids = ['block_heights', 'and_block_hashes'];
api.blocks.get('btc', block_ids, function(blocks)
{
    console.log(blocks);
});
```

AS WELL AS A IT'S OWN BLOCK-EXPLORER

CORTEX

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explorer help

credits : 11.00000000 flush logout

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blocks transactions addresses markets graphs

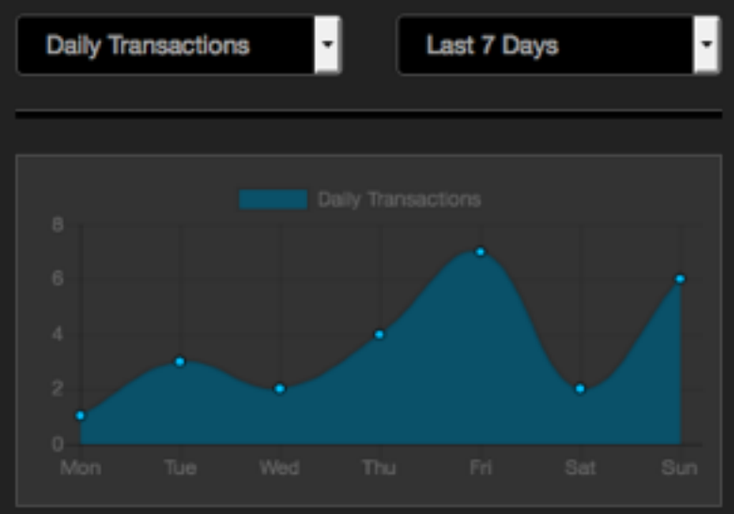
Search SEARCH

latest blocks

SEE ALL BLOCKS

Height	Age	Transactions	Size (KB)
403,716	12 seconds ago	783	399,714
403,716	12 seconds ago	783	399,714
403,716	12 seconds ago	783	399,714
403,716	12 seconds ago	783	399,714
403,716	12 seconds ago	783	399,714

Daily Transactions | Last 7 Days



latest transactions

SEE ALL TRANSACTIONS

Hash	Inputs	Outputs	BTC Value
30e34f2ba622b31ffa93b87f0f3d60208d8ce81033b797972b564b6aa9a5945b	7	2	0.000343518
30e34f2ba622b31ffa93b87f0f3d60208d8ce81033b797972b564b6aa9a5945b	7	2	0.000343518
30e34f2ba622b31ffa93b87f0f3d60208d8ce81033b797972b564b6aa9a5945b	7	2	0.000343518

currency calculator

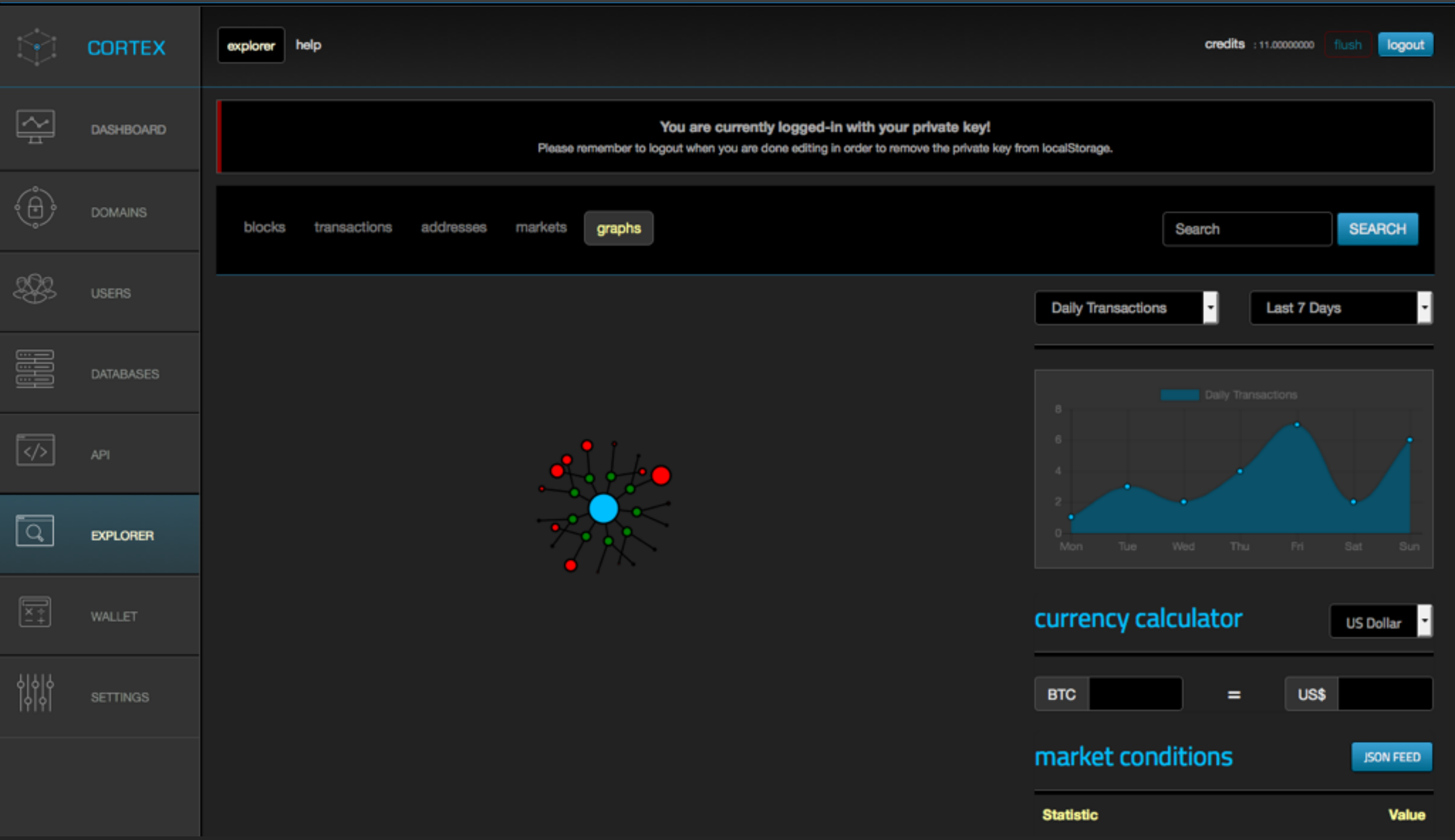
US Dollar

BTC = US$

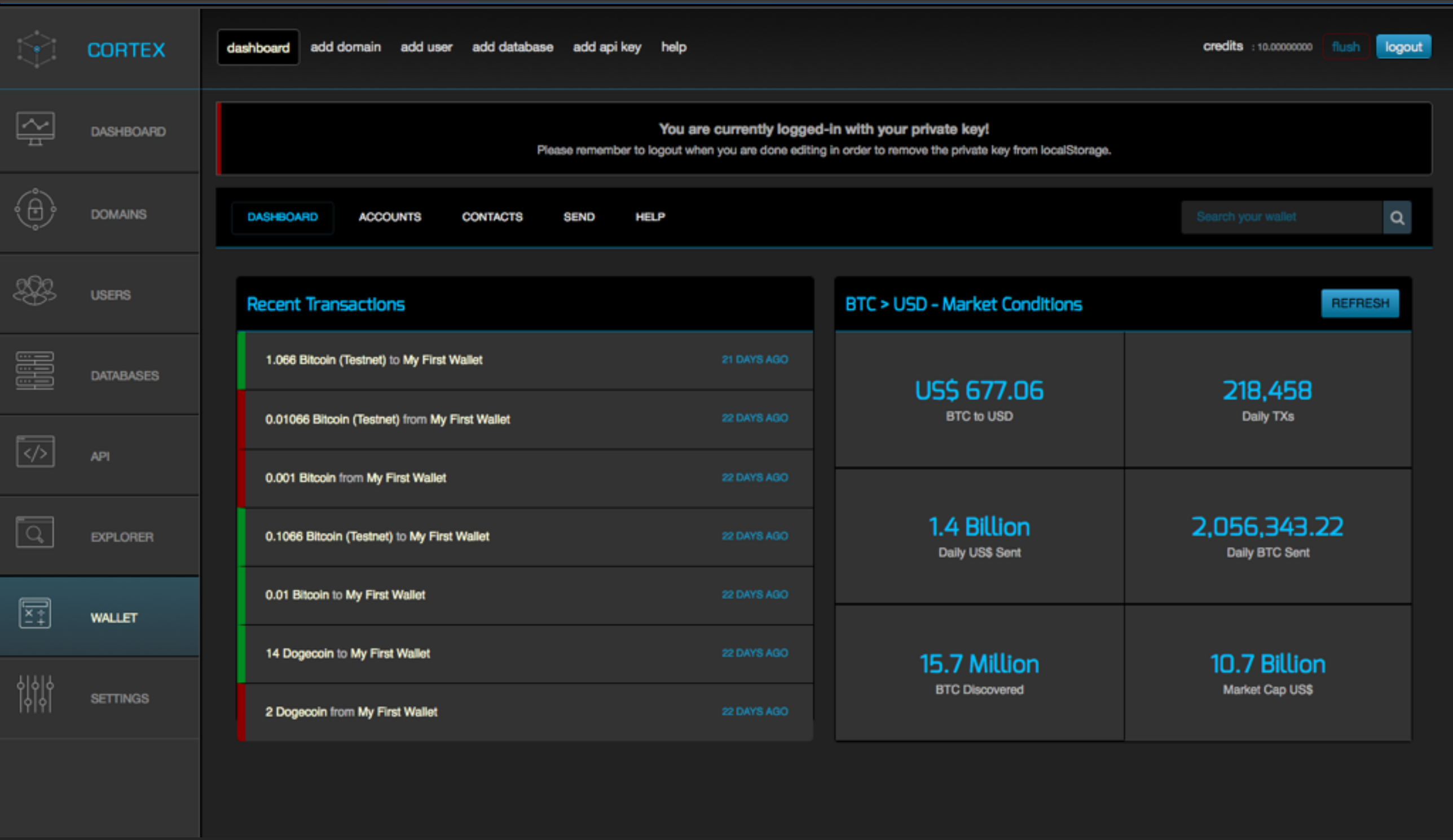
market conditions

JSON FEED

WITH GRAPH QUERIES FOR ADVANCED ANALYTICS AND TRACING



NOT TO MENTION INTEGRATED MULTI-CURRENCY WALLETS



WE'VE BEEN WORKING WITH AND TRAINING LEADING BRANDS

CIMB BANK

DBS

Maybank

Suruhanjaya Sekuriti
Securities Comission
Malaysia

axiata

BANK NEGARA MALAYSIA
CENTRAL BANK OF MALAYSIA

MDEC
Driving Transformation

BARCLAYS

neuroware

BEYOND THE FINANCIAL BOUNDARIES OF BLOCKCHAINS

EMAIL OUR TEAM DIRECTLY - founders@neuroware.io