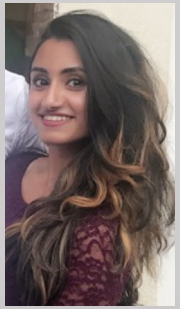


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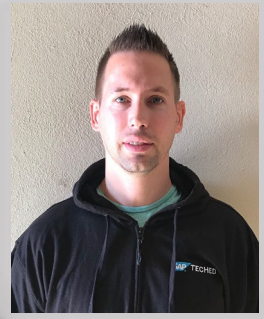
WHO ARE WE?



Aashna Lal
SAP Innovation Associate



Prabhat Pathania
Blockchain and Fiori expert

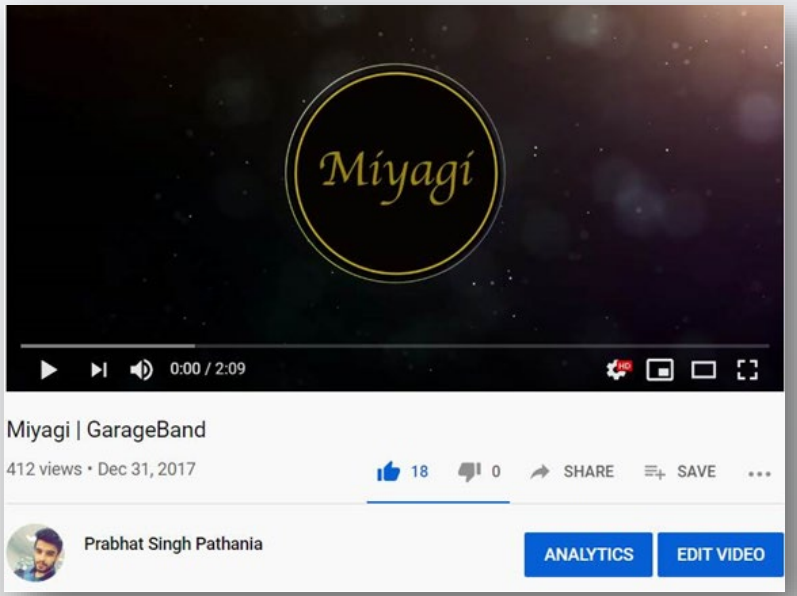


Bart van de Kamp
Development & Innovation Lead

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WHO ARE WE?




Miyagi
0:00 / 2:09
Miyagi | GarageBand
412 views • Dec 31, 2017
18
0
SHARE
SAVE
Prabhat Singh Pathania
ANALYTICS
EDIT VIDEO








MUD MASTERS
42
MARATHON
EDITION 2019

AGENDA

BLOCKCHAIN | **SOLUTION** | **LIVE DEMO** | **ARCHITECTURE**

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BLOCKCHAIN



Distributed Ledger

Transactions within a P2P network.

- Transparency
- Synchronicity
- Security



Decentralized

Consensus determines the existence, nature and evolution of the ledger.

- Faster settlements
- Low corruption risk



Cryptography

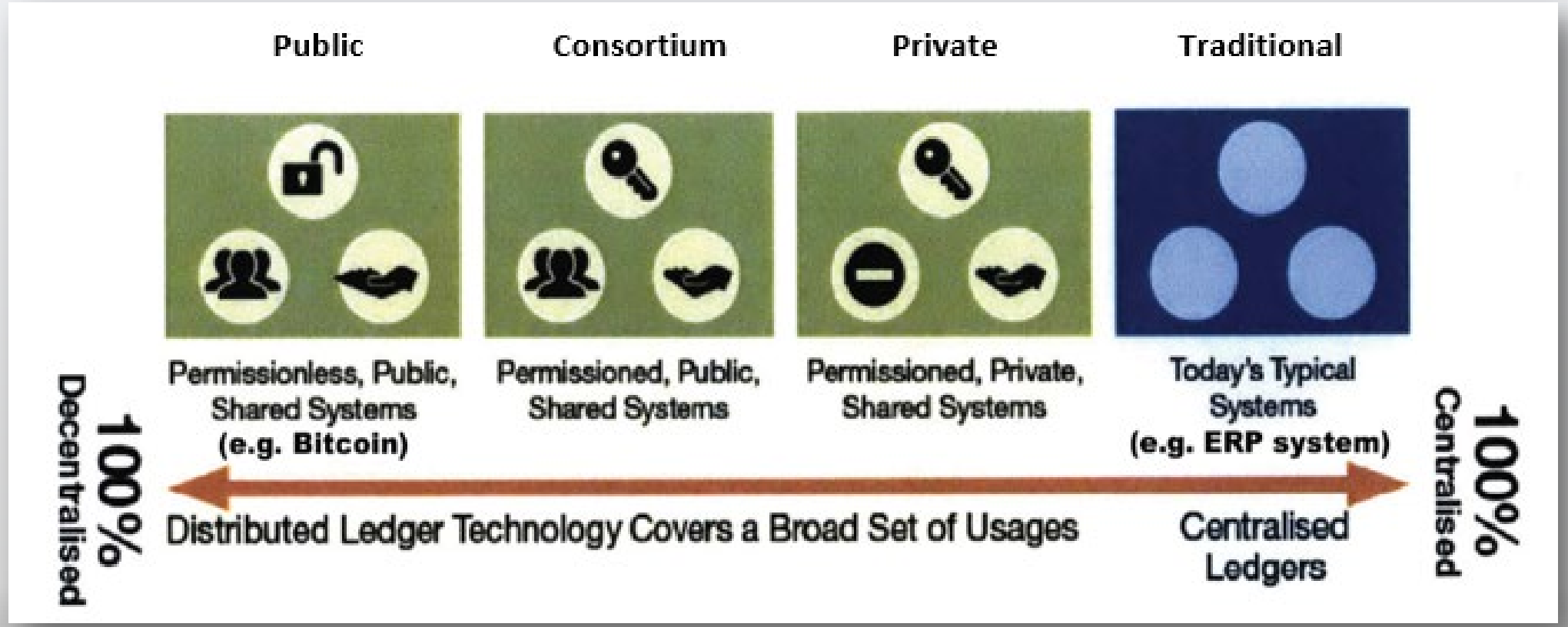
Secures the network on several layers.

- Trust
- Security
- Privacy

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BLOCKCHAIN



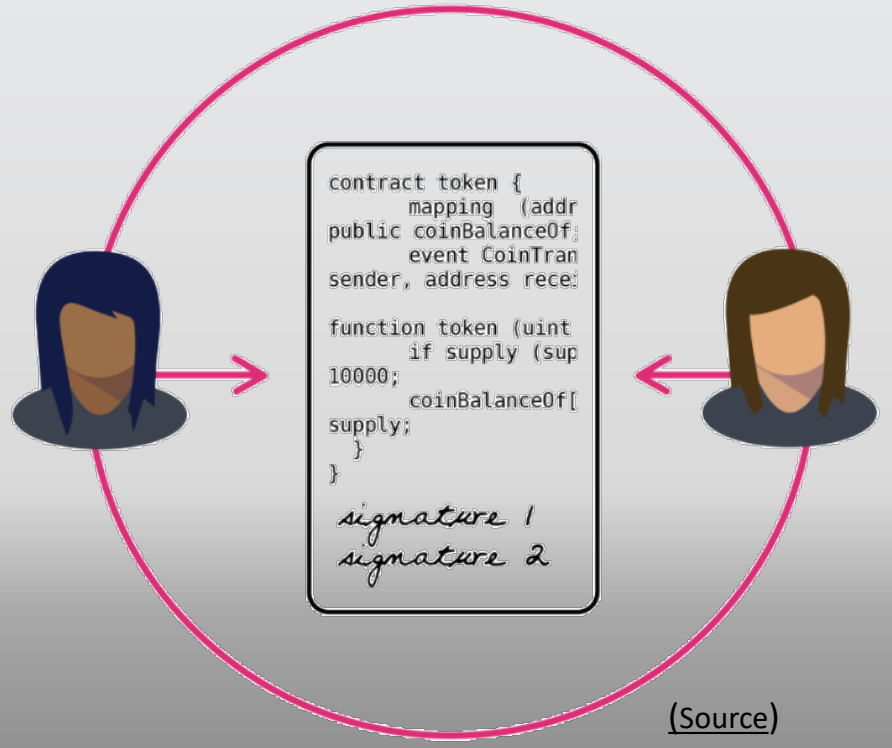
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BLOCKCHAIN

Smart contracts

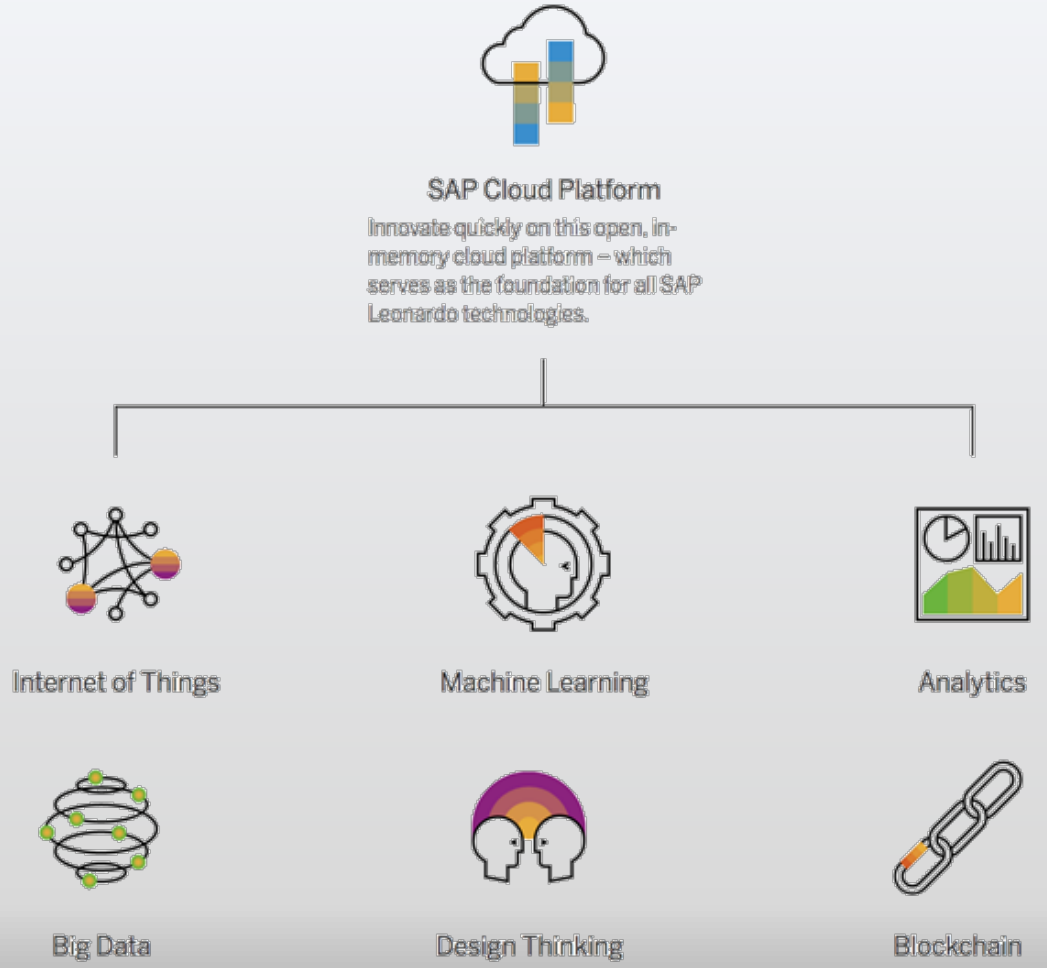
→ **self-executing** contracts of which the terms of the agreement between parties is directly written into lines of code that exists across the blockchain network.



(Source)

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SAP Intelligent Technologies



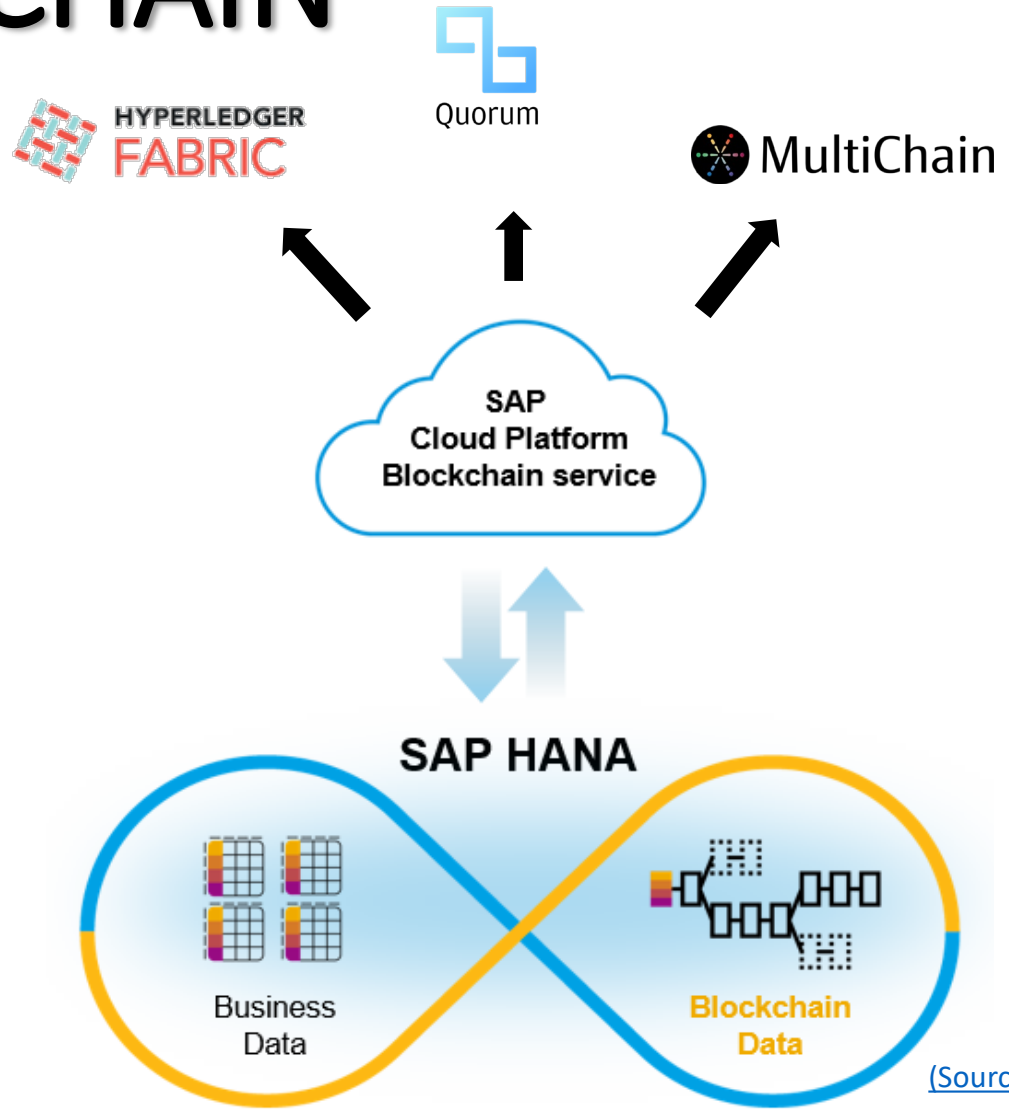
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SAP BLOCKCHAIN

SAP Cloud Platform Blockchain

SAP HANA Blockchain



(Source SAP)

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HYPERLEDGER FABRIC

Characteristics

- Linux Foundation
- Private permissioned networks
- Wide range of use cases in multiple industries

Key Properties

- **Privacy**: Data on a need-to-know basis through channel creation
- **Co-innovation**: Part of the Hyperledger umbrella
- **Modular design**: Plug-in components
- **Smart contracts**: written in **Chaincode**

Quorum

Characteristics

- JPMorgan
- Geth (Go Ethereum)
- Private permissioned networks
- Financial transactions

Key Properties

- **Maturity:** Inherits Ethereum's key properties.
- **Privacy & Transparency:** Customizable privacy
- **Zero-knowledge Security Layer:** private settlement without compromising private data
- **Smart contracts:** written in **Solidity**



MultiChain

Characteristics

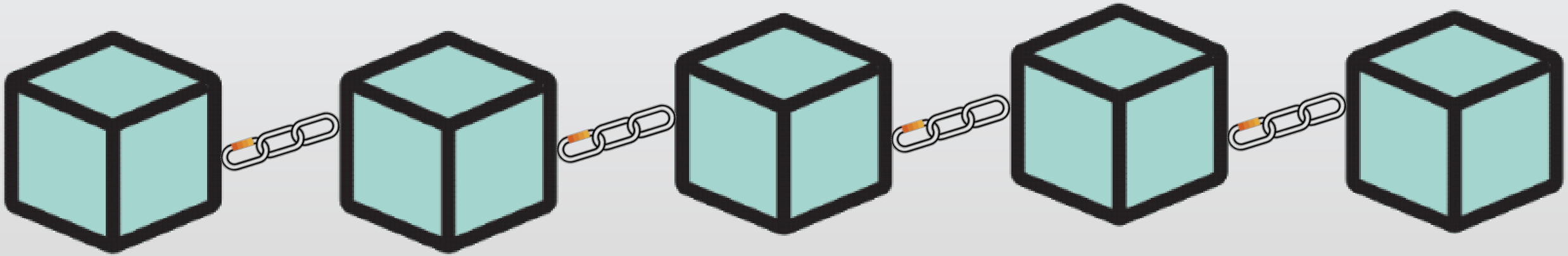
- Bitcoin Core
- Easy-to-use package for private blockchain networks
- Institutional financial sector

Key Properties

- **Private:** Visibility for chosen participants
- **Permissioned:** Handshaking process
- **Privileged:** Mining is secure through privileged voting

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SAP HYPERLEDGER FABRIC BLOCKCHAIN IN ACTION!



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MARKET DEVELOPMENTS



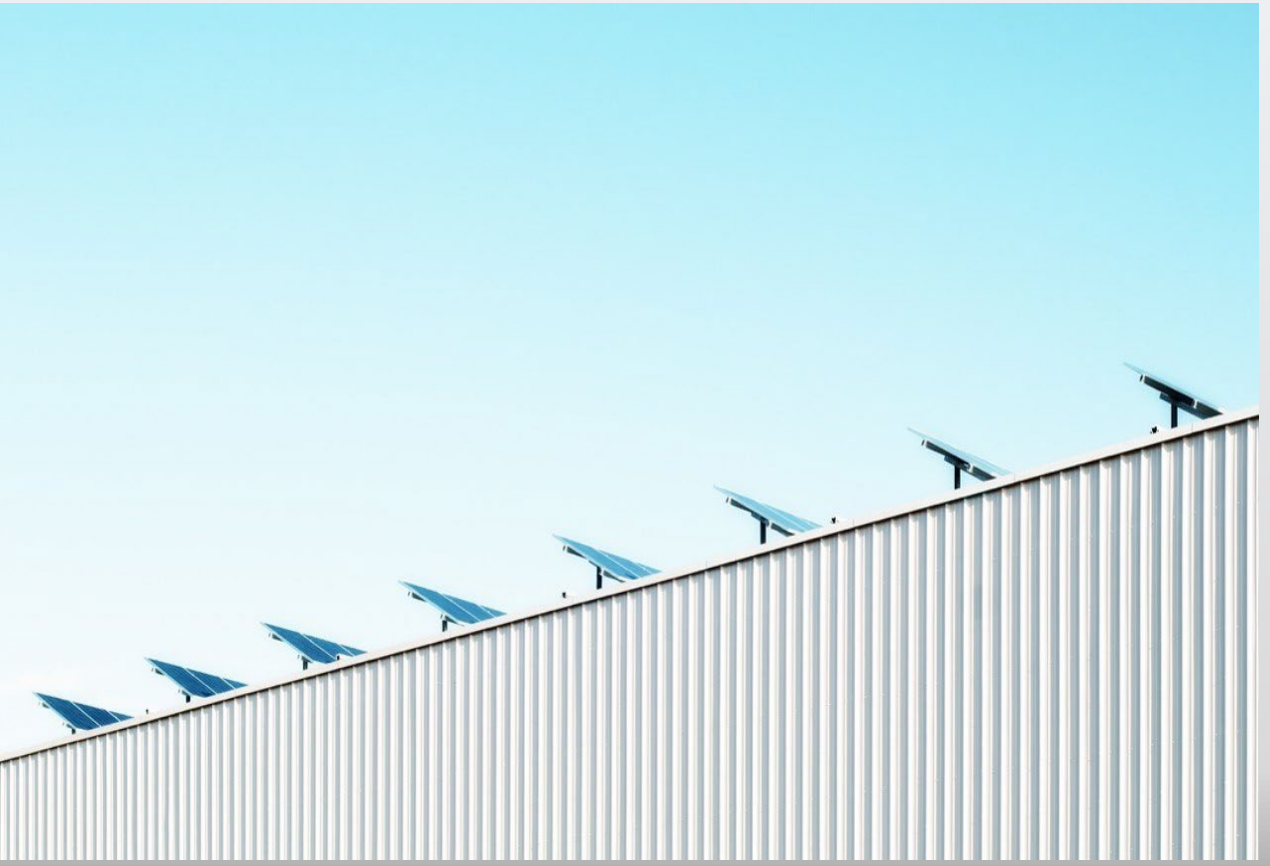
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MARKET DEVELOPMENTS





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MARKET CHALLENGES





How to balance the supply and demand !

Unpredictable energy production

Peak in energy demand

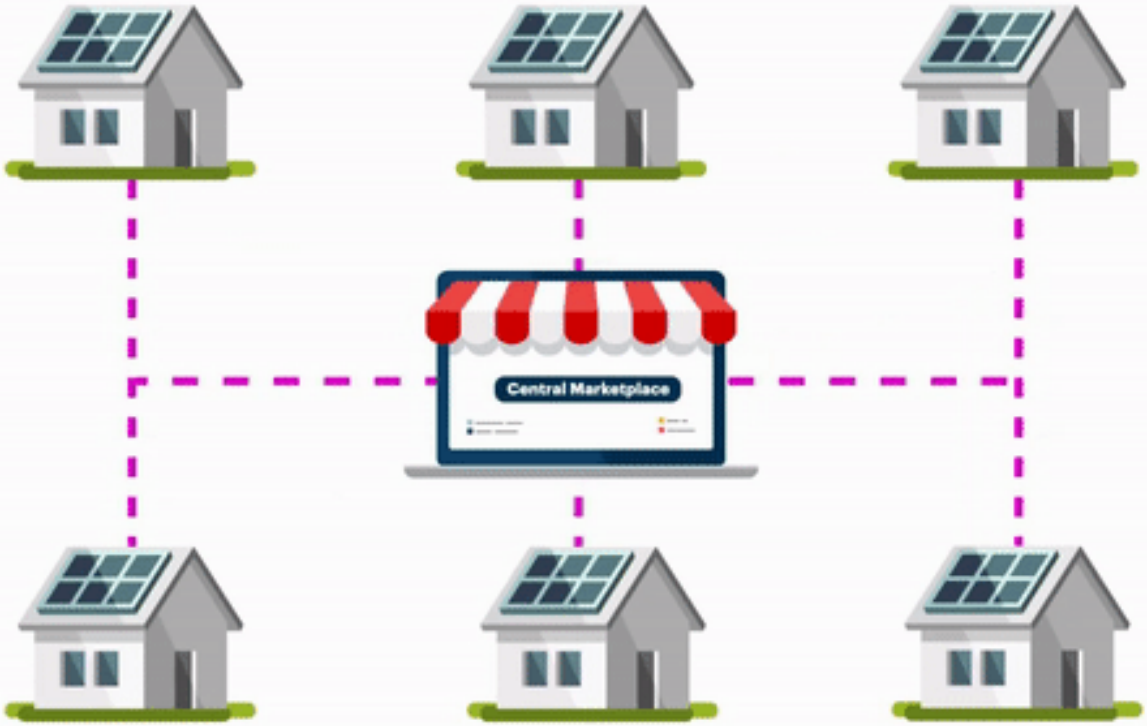
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TECHNOLOGICAL ADVANCEMENTS



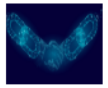
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BLOCKCHAIN MICROGRID



Click on the picture for the solution video

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Energy Marketplace

Powered by Blockchain

Hello Prabhat

Community Dashboard | Personal Dashboard | My Profile

My Profile

Personal Information

First Names:	Prabhat
Last Names:	Pathania
Phone:	065
Email:	prabhatpathania19@gmail.com
VAT Registration Number:	01010101
Billing Address:	11,AA
Zip Code:	1111
City:	Amsterdam

Asset Data

Asset Name:	Dummy
Asset ID:	01
HouseHolder Type:	Prosumer
Production Capacity:	100 KW

Energy Marketplace

Powered by Blockchain

Hello Aashna

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istorical Data

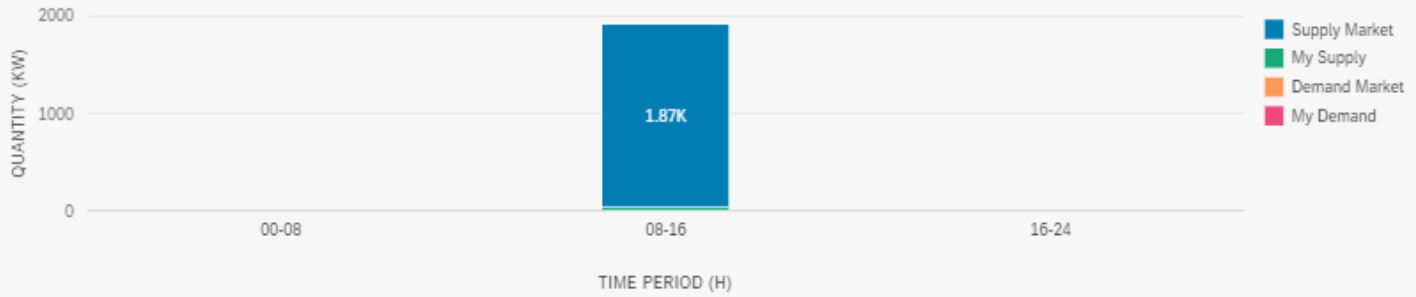
Personal Dashboard - Live Feed

y Balance

Total energy sold	30 Kw	Total Revenues	6,00 €
Total energy bought	0 Gw	Total Expenses	0,00 €

Open Transactions

My Transactions Vs Market offers



Bid Type	Energy (KW)	Unitary Price (€)	Valid Until	Supply From	Supply Until
SALE	5	0.20	2019-11-22 11:51	2019-11-22 11:00	2019-11-22 12:00
SALE	5	0.20	2019-11-22 11:49	2019-11-22 11:00	2019-11-22 12:00
SALE	5	0.20	2019-11-22 11:48	2019-11-22 11:00	2019-11-22 12:00
SALE	5	0.20	2019-11-22 11:46	2019-11-22 11:00	2019-11-22 12:00
SALE	5	0.20	2019-11-22 11:45	2019-11-22 11:00	2019-11-22 12:00
SALE	5	0.20	2019-11-22 11:43	2019-11-22 11:00	2019-11-22 12:00

Results - 6 of 6 Page 1 of 1

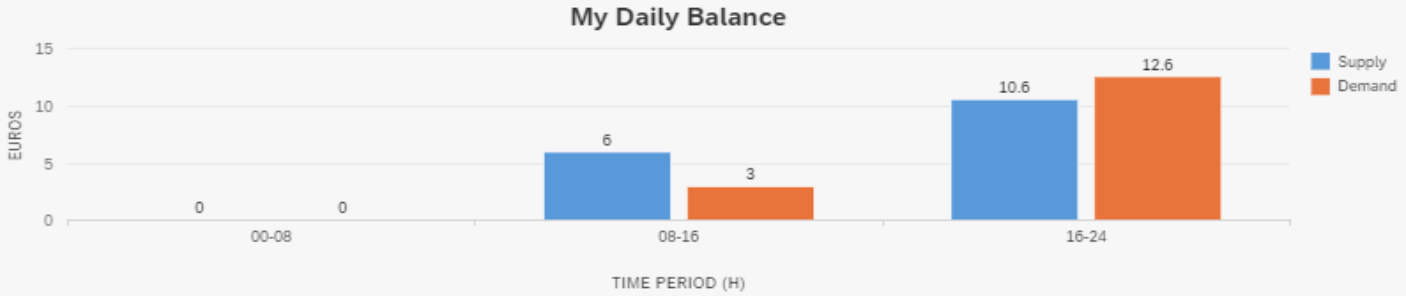
Energy Marketplace

Powered by Blockchain

Hello Aashna

Personal Dashboard - Historical Data

ate Filter Today



Bid Type	Energy (KW)	Unitary Price (€)	Status	Supply From	Supply Until
SALE	0	0.2	COMPLETED	2019-11-22 10:00	2019-11-22 11:00
SALE	0	0.2	COMPLETED	2019-11-22 10:00	2019-11-22 11:00
SALE	0	0.2	COMPLETED	2019-11-22 10:00	2019-11-22 11:00
SALE	0	0.2	COMPLETED	2019-11-22 10:00	2019-11-22 11:00
SALE	5	0.2	EXPIRED	2019-11-22 10:00	2019-11-22 11:00
SALE	5	0.2	EXPIRED	2019-11-22 10:00	2019-11-22 11:00
SALE	5	0.2	EXPIRED	2019-11-22 10:00	2019-11-22 11:00
MATCH	2	0.2	AGREEMENT	2019-11-22 10:00	2019-11-22 11:00
MATCH	4	0.2	AGREEMENT	2019-11-22 10:00	2019-11-22 11:00
MATCH	4	0.2	AGREEMENT	2019-11-22 10:00	2019-11-22 11:00

Energy Marketplace

Powered by Blockchain

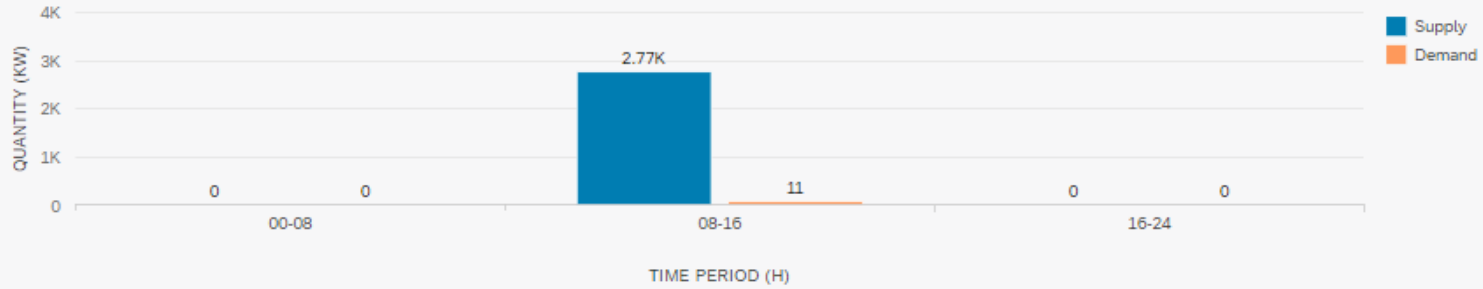
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Historical Data

Community Dashboard - Live Feed

Open Transactions

Active Bids



Bid Type	Energy (KW)	Unitary Price (€)	Valid Until	Supply From	Supply Until
SALE	16	0.20	2019-11-22 11:07	2019-11-22 11:00	2019-11-22 12:00
SALE	9	0.20	2019-11-22 11:06	2019-11-22 11:00	2019-11-22 12:00
SALE	3	0.20	2019-11-22 11:05	2019-11-22 11:00	2019-11-22 12:00
PURCHASE	1	0.20	2019-11-22 11:04	2019-11-22 11:00	2019-11-22 12:00
PURCHASE	2	0.20	2019-11-22 11:03	2019-11-22 11:00	2019-11-22 12:00
PURCHASE	6	0.20	2019-11-22 11:01	2019-11-22 11:00	2019-11-22 12:00
PURCHASE	2	0.20	2019-11-22 11:00	2019-11-22 11:00	2019-11-22 12:00
SALE	3	0.20	2019-11-22 10:59	2019-11-22 10:00	2019-11-22 11:00

Energy Marketplace

Powered by Blockchain

Hello Ron

Community Dashboard | Personal Dashboard | My Profile

Live Feed

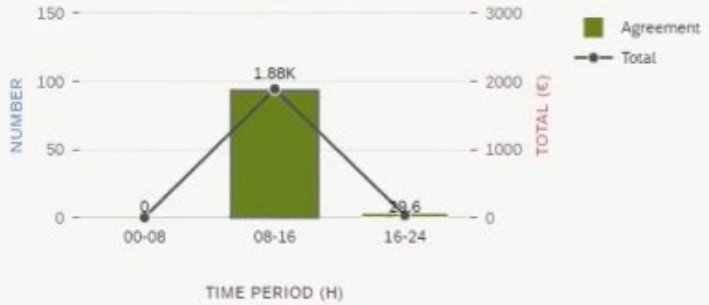
Community Dashboard - Historical Data

Date Filter: Today

Supply vs Demand



Agreements



Bid Type	Energy (KW)	Unitary Price (€)	Status	Supply From	Supply Until
PURCHASE	0	0.2	COMPLETED	2019-09-20 16:00	2019-09-20 17:00
PURCHASE	0	0.2	COMPLETED	2019-09-20 16:00	2019-09-20 17:00
PURCHASE	0	0.2	COMPLETED	2019-09-20 16:00	2019-09-20 17:00
MATCH	40	0.2	AGREEMENT	2019-09-20 16:00	2019-09-20 17:00
MATCH	49	0.2	AGREEMENT	2019-09-20 16:00	2019-09-20 17:00

Live Feed

Community Dashboard - Historical Data

Date Filter Last 12 Months

Transactions

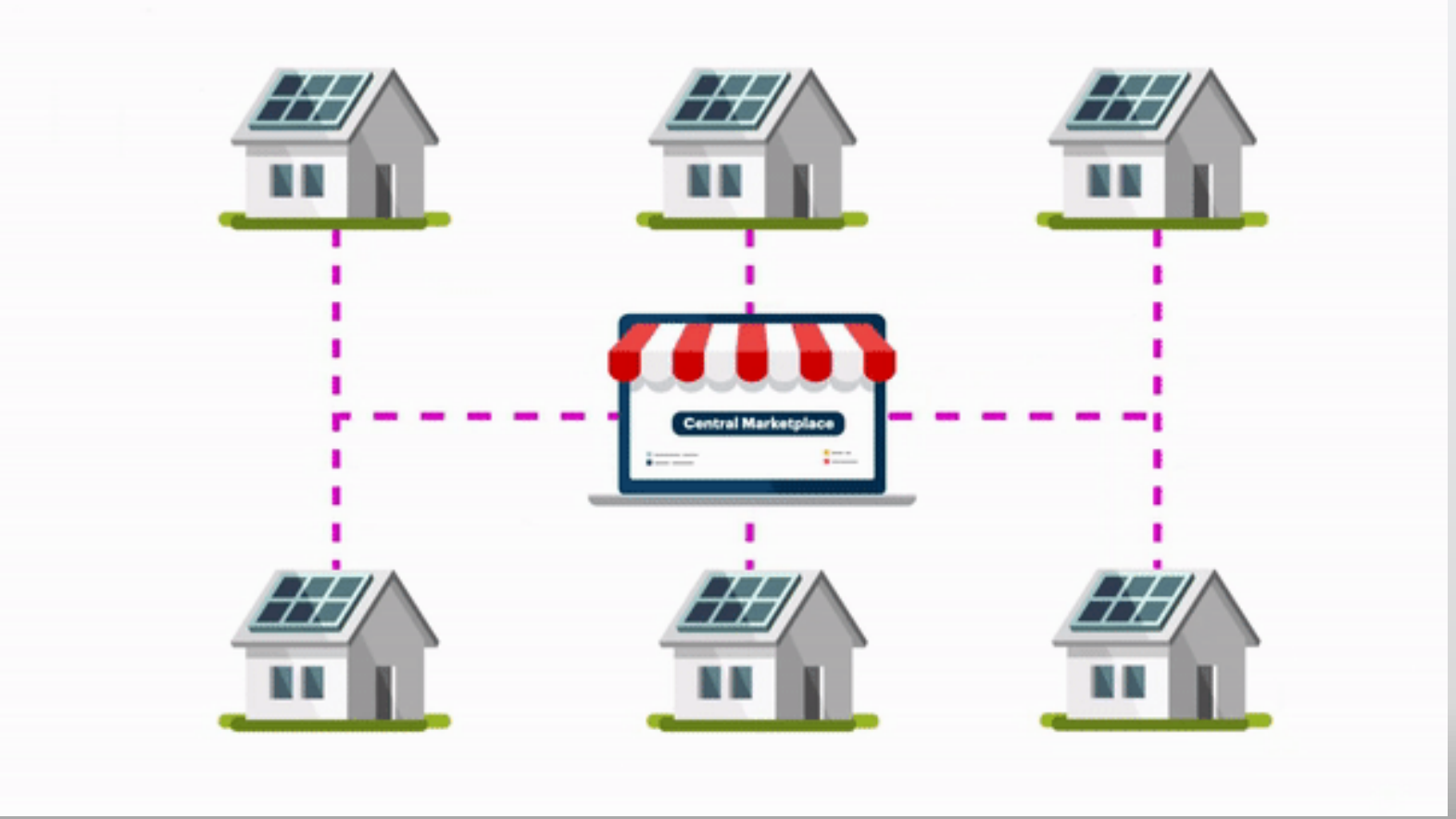
Market View - Past Year



Bid Type	Energy (KW)	Unitary Price (€)	Status	Supply From	Supply Until
PURCHASE	0	0.2	COMPLETED	2019-11-22 11:00	2019-11-22 12:00
PURCHASE	0	0.2	COMPLETED	2019-11-22 11:00	2019-11-22 12:00
PURCHASE	0	0.2	COMPLETED	2019-11-22 11:00	2019-11-22 12:00
MATCH	9	0.2	AGREEMENT	2019-11-22 11:00	2019-11-22 12:00
MATCH	9	0.2	AGREEMENT	2019-11-22 11:00	2019-11-22 12:00
MATCH	9	0.2	AGREEMENT	2019-11-22 11:00	2019-11-22 12:00
PURCHASE	0	0.2	COMPLETED	2019-11-22 10:00	2019-11-22 11:00
PURCHASE	0	0.2	COMPLETED	2019-11-22 10:00	2019-11-22 11:00
PURCHASE	10	0.2	EXPIRED	2019-11-22 10:00	2019-11-22 11:00
PURCHASE	10	0.2	EXPIRED	2019-11-22 10:00	2019-11-22 11:00

Results - 10 of 6735 Page 1 of 674 Next

LIVE DEMO

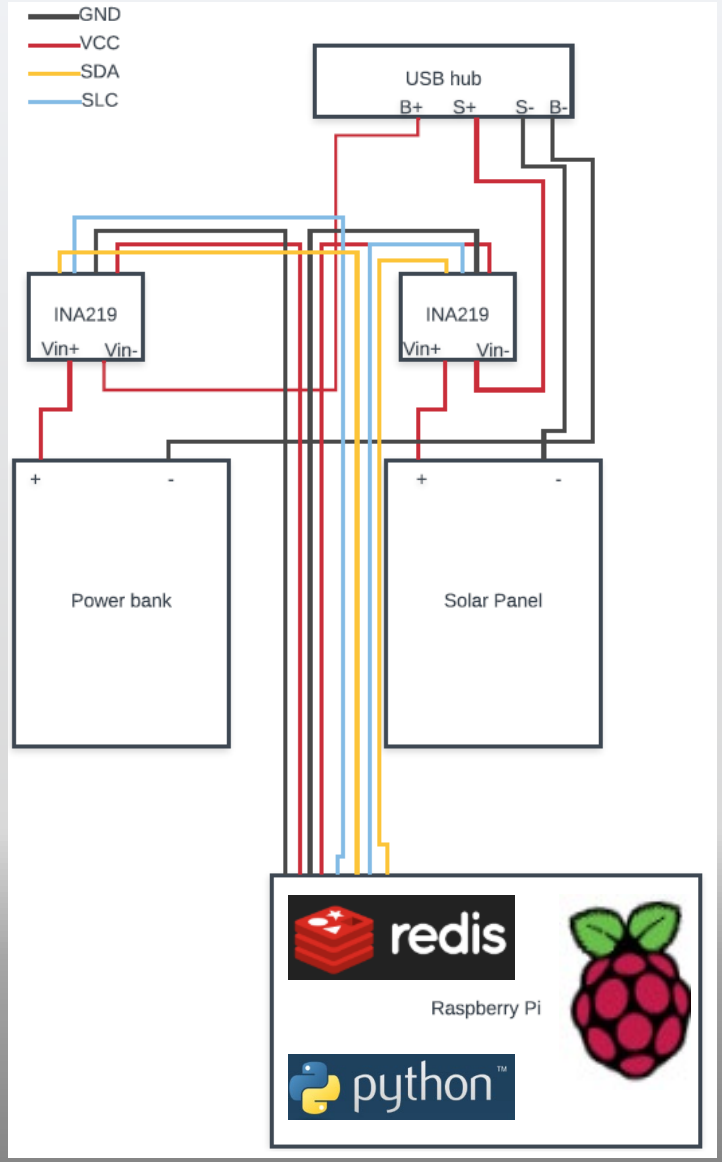


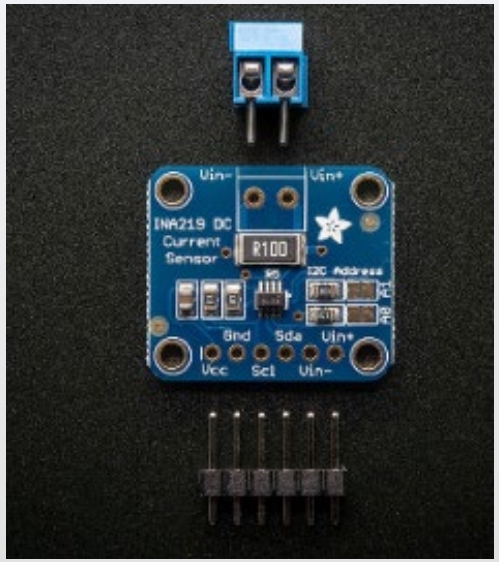
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ARCHITECTURE – LOCAL SERVER









Items:

- Solar powered power bank
- Raspberry PI Zero
- INA219 Sensor

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Thank you!

Any questions?

 **AASHNA LAL**

 **BART VAN DE KAMP**

 **PRABHAT PATHANIA**

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