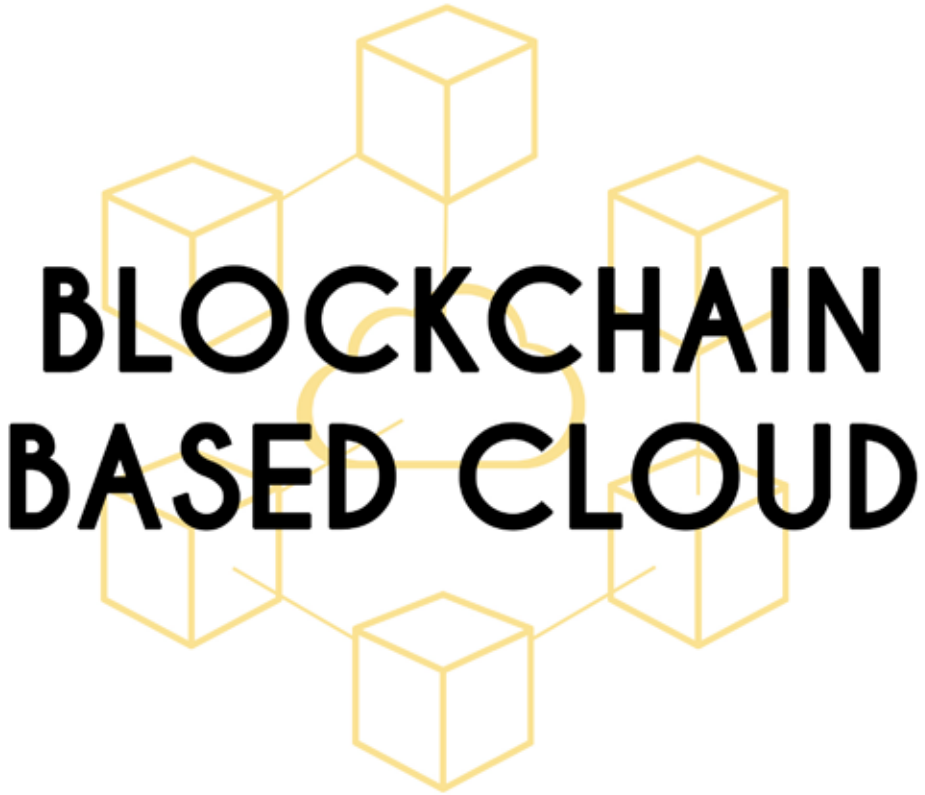

RANCHIMALL
16th November 2019.

Cloud is one of the **fastest growing business** segments today.

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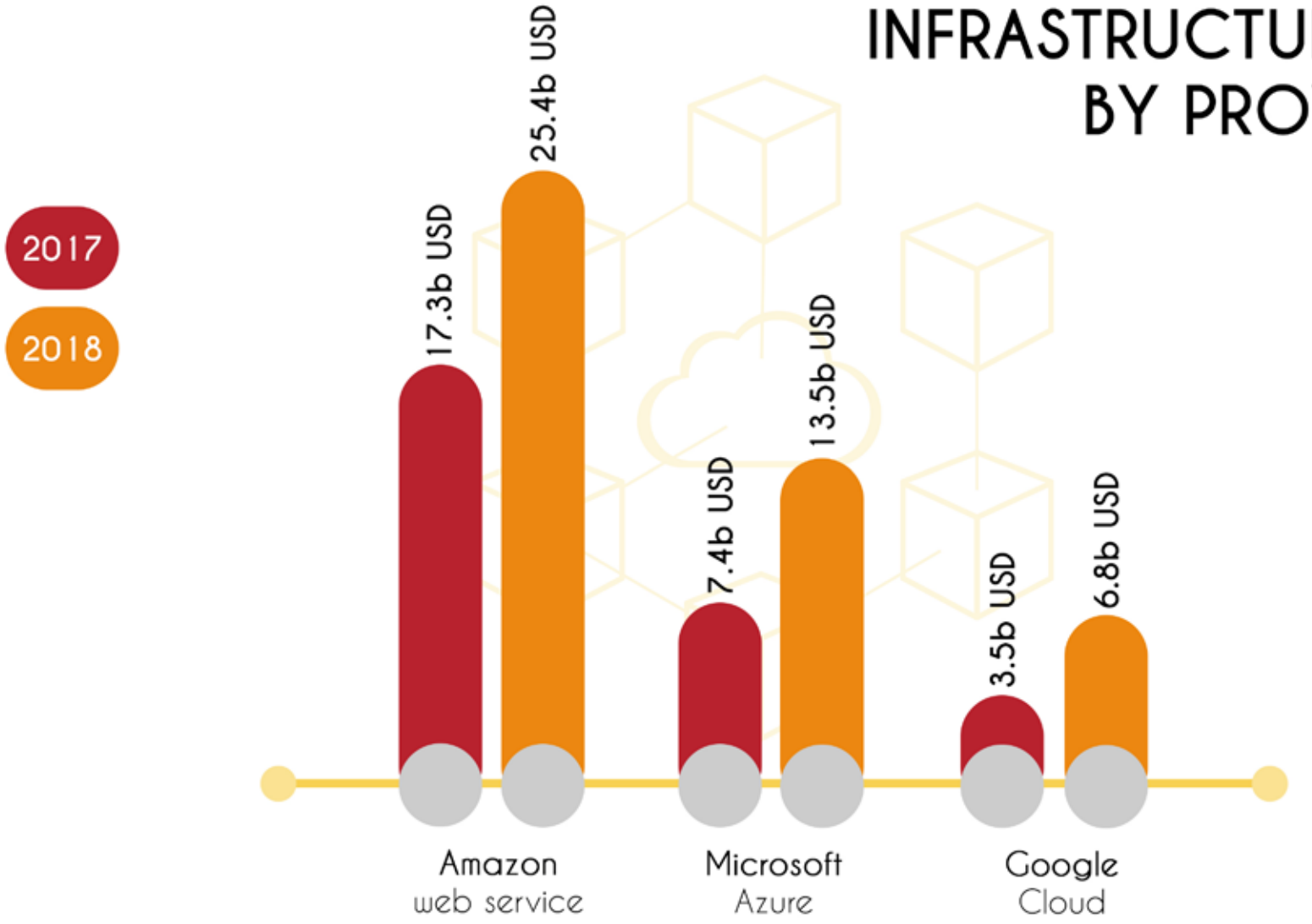
BLOCKCHAIN BASED CLOUD

WORLDWIDE CLOUD INFRASTRUCTURE SPENDING BY PROVIDER



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A blockchain based cloud data delivery system could be the **magic general usage application** for ordinary users.

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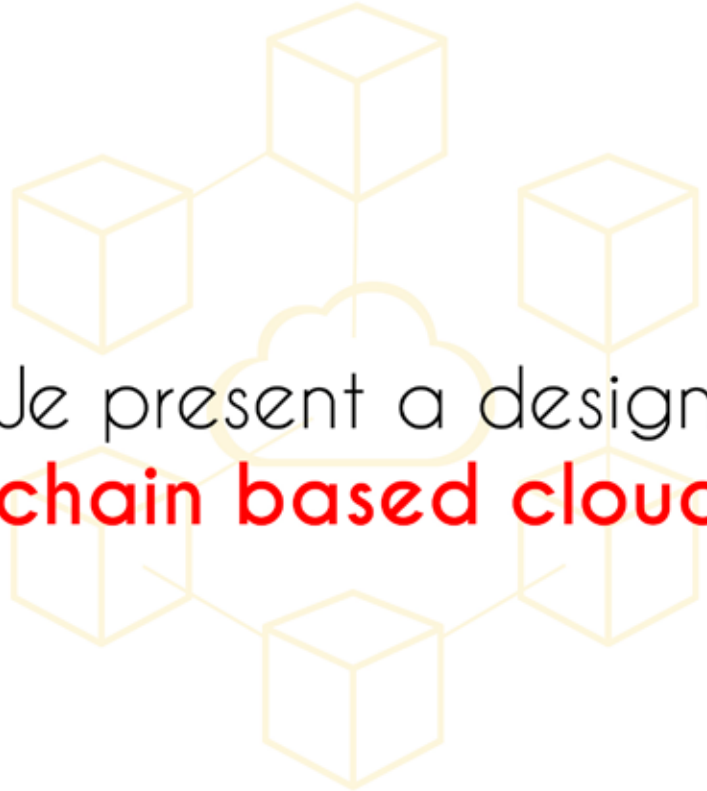

We present a design for

blockchain based cloud system.

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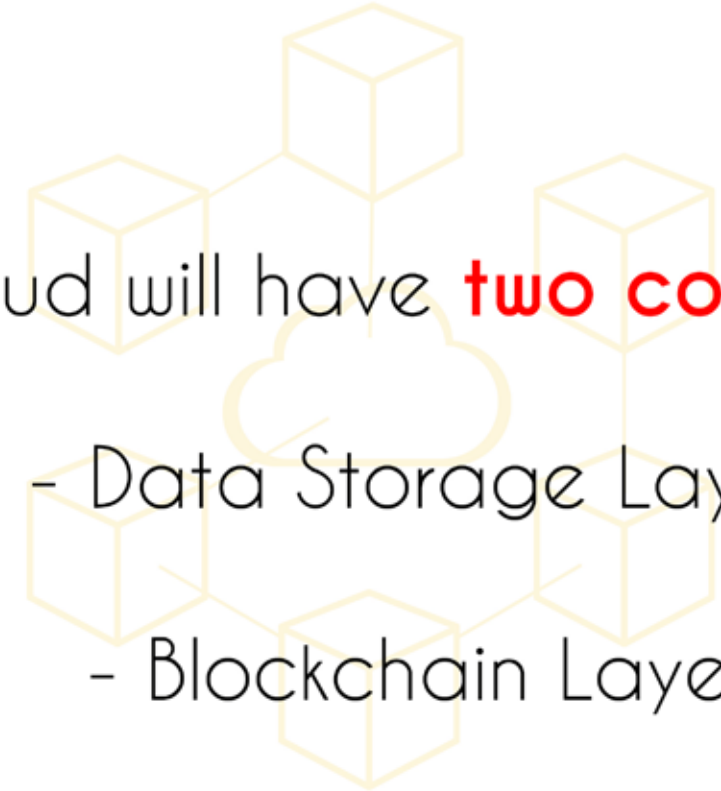


The cloud will have **two components**:

- Data Storage Layer

- Blockchain Layer

Data storage layer will store the **raw data**.

Blockchain layer will specify **how components** of data storage layer should **interact with each other**.

Data storage layer will be **decentralized.**

It can add more **independent**
data storage units as per
the instructions in the blockchain.

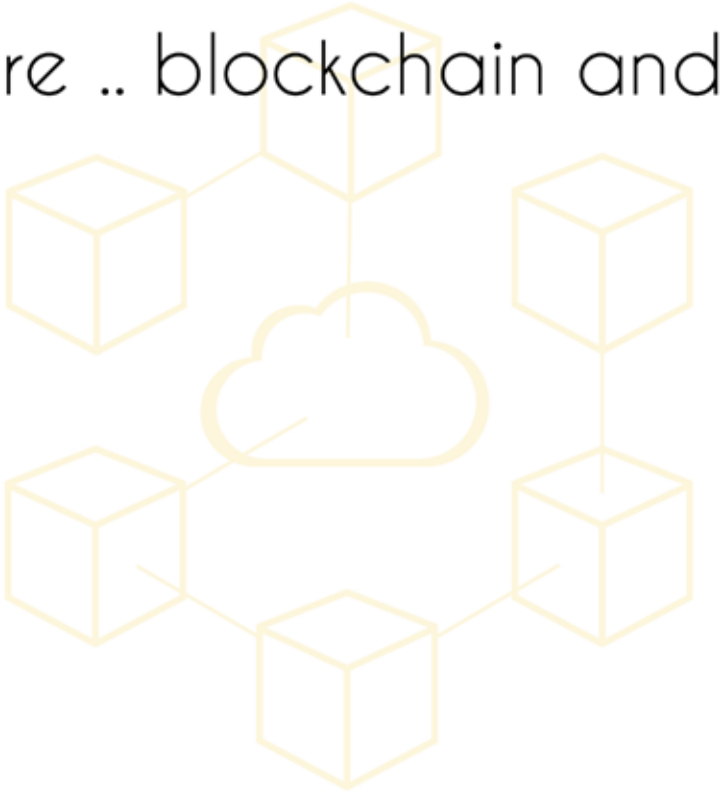
Every sub-component of the data storage layer are **independent units** capable of being hosted **in independent servers.**

We will call these sub-components as **supernodes** of data storage layer.

Supernodes will **back up data stored** in each other and will **automatically take over** in case of failure of one or more supernodes.

BLOCKCHAIN BASED CLOUD

diagram here .. blockchain and supernodes .



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To participate in the cloud, applications and users will need **blockchain based identifiers.**

Even critical data pieces will have blockchain based identifiers.

If every every critical participant has similar identification scheme, (blockchai ID then interoperability will be **greatly facilitated.**

And **each entity can use the same software elements** for common functions among them like digital signatures, encryption and messaging schemes.

A common naming scheme based on **blockchain ID** will allow **different elements to work together.**

For example an **application can pick a supernode** whose name is closest to its own name, and store its data there.

A user can store his own data to closest sounding name among all the supernodes if the **naming scheme** for users and supernodes **are same.**

With a **common naming system**, a supernode can pick its closest neighbors for backing up its data.

And all users can **easily find out** which supernode to approach for getting backed up data if one of supernodes is not responding.

Another advantage of having everyone to get blockchain based IDs is **everyone can send messages to each other** after digitally signing the messages.

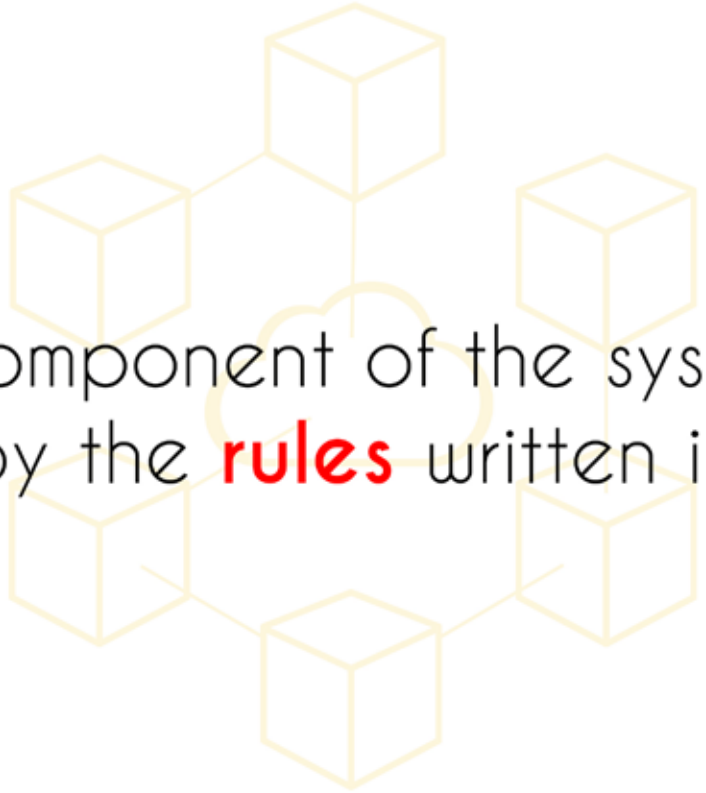
With **digital signatures**, the message receiver will be absolutely sure that message was indeed sent by the signer.

Usage of digital signature
in the system will **eliminate need**
of usernames and passwords.

Having common blockchain IDs for users, applications and supernodes would also permit **messages to be easily sent to each other** using data encryption.

Typically for encryption,
a public key infrastructure (PKI) is required.

**With blockchain based IDs,
PKIs are not needed.**



Every component of the system is held together by the **rules** written in blockchain.

Blockchain provides the **trust.**

And supernodes provide the **data** in the cloud.

BLOCKCHAIN BASED CLOUD

This blockchain based cloud system will **not need any fixed server.**

Both blockchain layer and data storage layers will be **decentralized.**

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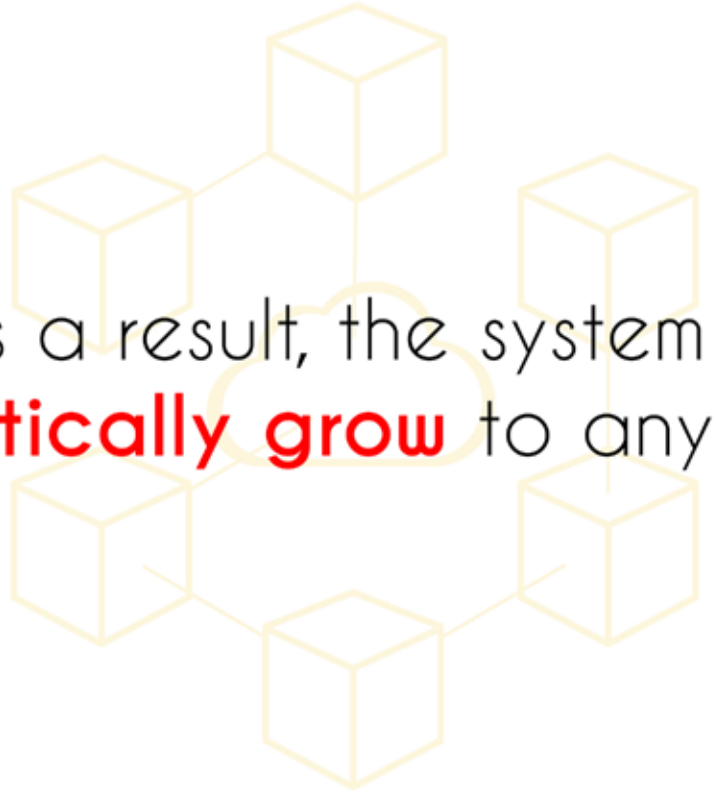

As a result, the system can
automatically grow to any data size.

The system will grow very elegantly
as number of users and data
increases in automatic mode.

Usage of the system:

A user will need to read the blockchain
to **find out list** of supernodes.

Then **find out** himself the **relevant supernode**
to approach for required data.

If the identified supernode is not available,
then **calculate** the next closest supernode.

And then **approach** the backup supernode.

Similarly the application putting the data in the cloud can **first ask the blockchain** for list of supernodes.

And **then write it's data** to the supernode whose name is closest to its own name.

Any user can ask any application for data.

User will also **need to know data formats** used by the application to make meaning of the data.

The cloud will provide **automatic backup and recovery** for any data that the application stores.

Implementation Details:

FLO Blockchain will be used for blockchain layer.

JavaScript will be used as programming language.

The cloud will only store
JavaScript objects and JavaScript variables.

This design decision will **dramatically simplify access** to the cloud as well as provide universal data access.

Any web user JavaScript data objects
can **directly be stored as equivalent**
JavaScript objects in the cloud.

Any key value database can
directly be stored as key values inside
JavaScript objects in the cloud.

This data storage model **will be able to support** any data need of **web based applications.**

The supernodes are equipped with serving JavaScript data on both increment as well as wholesome basis.

In incremental mode, **users can obtain difference** in JavaScript object data since last data was fetched.

In wholesome mode, the entire catalogue of data being stored in **JavaScript object will be served**.

Data storage is a pervasive human need.

Efficient, convenient and potentially unlimited web based data can be realized using **blockchain based cloud architecture** provided right economics can be designed.

Simplicity of the architecture

The supernodes are **simply JavaScript enabled web browsers** running behind a webserver.

The database in supernodes is **IndexedDB** which is inbuilt database in web browsers.

The entire supernode **logic is in JavaScript.**

Adding a new supernode is **as simple as** running another latest Chrome equivalent web browser.

A supernode in theory **can be run over a mobile phone** if the phone was always accessible.

Communication and messaging
is performed **using websockets** which
is available on all modern browsers.

This cloud based architecture is **simple, extensible, resilient,** and **very simple to use.**

The architecture complements **capabilities of the blockchain.**

Since the smartphone revolution, we have reached
very powerful computing capacity
in hands of ordinary users.

However pervasive public shared
data storage is stuck in Giga Byte range.

Blockchain based cloud computing in theory can **dramatically increase shared data storage capability** of ordinary users.

Coupled with all the promise that blockchain itself brings, **blockchain based cloud computing** is potentially a **game changer in cloud data storage.**

Economics of the blockchain based cloud storage:

The blockchain based cloud system is sustainable if the **value** acquired from consumers and investors of cloud data is **higher than costs** incurred to service them.

Digital Ocean for 40 USD per month offers a cloud instance with **160 GB** of data storage, **4 CPU** computing capacity and **5 TeraBytes** of data transfer.

10000 supernode system will cost 400,000 USD per month.

This equates to **5 million USD** per year.

So the system **has to generate**
more than 5 million USD per year
in net value from consumers and investors.

If a blockchain based token system is initialized,
it has to create more than 5 million USD
in either net tokens investments or in transaction fees.

If **10 large investors** put
5 million USD each, it will **cover the cost**
of 10000 supernode system **over 10 years.**

In those 10 years, the system will need to start
to **generate more 10 million USD per year**
to be sustainable and pay for cost of capital.