Blockchain in the Cloud

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SDBIS, 2`nd year

Iasi, 2018

Abstract

As the business world comes day by day with more and difficult technologies to keep track on, there is blockchain concept that is not fully covered with applications. Offered as a service and trusted by big companies like Amazon, Microsoft and Google, blockchain can use cloud storage for their distribution of the retention part for the encryption of data.

For running distributed applications, blockchain technologies have some issues like the storage capacities, virtual machines that are not efficient and protocol latency that might be high, disadvantages that are covered in context of traditional Cloud computing. As the applications will demand, blockchain technologies will come with additional capacities in order to beat down some of those issues and gain the market.

Key Words: blockchain, bitcoin, cloud computing, distributed applications, virtualization, storage, blockchain as-a-service, computing resource, cloud strategy

Introduction

In scientific communities and industries is a growing demand for computing power that need to be used to process huge volumes of data and run large applications. Cloud infrastructures can be seen as providers of computing power to run Big Data applications.

Over the last few years Bitcoin and virtualization have been one of the most widespread technologies. Virtualization created the context for cloud computing and the protocol called Bitcoin is reinventing finance using blockchains that are cryptographic blocks. The `blockchain` term is often mention in the context of bitcoin, and Don & Alex Tapscott (*authors of 'Blockchain Revolution') described blockchain as a ledger of economic transactions that is incorruptible and can be used for the virtualization of everything as a value, not just financial transactions.

Content

The distribution of every transaction that takes place is done on the edge of the network, showing that bitcoin is dependent on those blockchains. The responsibility is not taken by a centralized authority who may say what is true or not, the distribution is made by different parts that come to consensus, and can be access by anyone in the future. In order to take actions like going back and do changes in history, the majority consensus is mandatory, and impossible for a single part to do it.

The implementation of blockchains consist by two types: `trusted` and `trustless`. The records that are kept public and easily verifiable is a trustless example where blockchains database`s storage is not on a single location for a bitcoin. A hacker won`t find any centralized version for any part of the information for corrupting it. The data is accessible by anyone from the Internet and there are millions of computers that host the information simultaneously. It is a modern version of a bank with traditional ledger.

MAS that stand for Monetary Authority of Singapore, is an example plan for settling inter-bank transfers using blockchain in a trusted approach. The computers from the private network of the bank are used to implement the same technologies and processes as the trustless system does, but this time in a private environment where are settled inter-bank transfers.

The bitcoin is not the only crypto-currency used in blockchain technology. There are virtually endless array of solutions that allows distribution data and recording transitioning as a cryptographic method. There are a lot of things similar to identity verification, intellectual property, trades, loans and land titles.

Blockchain with distributed cloud improves Quality-of-Service. Service Level Agreement provides Cloud resources. The correct usage of a computing resource is specified and validate by the SLA. A measurable metric as Mean Time Between Failures (MTBF) is guaranteed by vendors.The traceability for using a resource is provided by the blockchain, the provider and the customer can check that service level agreement has been correctly fulfilled, and find which part takes responsability for faults or paying compensation fees.

For the blockchain revolution to happen quickly, it’s unlikely that every organisation will build its own infrastructure to support it, but there’s still a chance thanks to the cloud. Not every organization will change or make its own infrastructure for supporting blockchains. If someone

want to take part in a blockchain, cloud environment is not mandatory, but it can make participation much easier as against traditional on-premises solutions. For a more consistent level of security and the performance of a blockchain using cloud integration is also a good idea. Blockchain cloud configuration is already set up for some providers as Microsoft [1]and Amazon[2] that offer `blockchain as-a-service`.

Some advantages of using blockchain in the cloud are:

- Offers a largely identity and role based for accessing applications that are blockchain-enabled. Identity and approaches of management that are access-based use public cloud, for example those provided by AWS, Microsoft or Google. There is no need for integration, as the cloud providers have these services as native services.
- An important thing for blockchain transactions is scaling and descaling that public clouds allow you by allocating as many instances as desired.
- Spreading files on regional data centers is the way used by big cloud services providers for handling redundancies, the make a point of failure on each data center. The data storage on multiples individual nodes that are dispersed across the globe represents a decentralized blockchain.
- The user files are not accessible and the user data cannot be controlled by third parties. The encryption of fragments for user data is stored on each node and the users controls their own keys.

Some small innovative business that need High Performance Computing or expensive Cloud Services might not have financial resources to acquire and operate HPC platforms, and Cloud vendors services, so they need to find a solution to use infrastructure with a lower cost. A solution might be accessing of underused computing resources. Desktop Grids (rely on idle Desktop PCs) or Amazon Spot instances (allows bidding on unused Cloud resources) are typical examples of such target resource. Those solutions are attractive because of the computing power provided at a low cost. There are some people that noticed how much energy is required (and

[1] https://azure.microsoft.com/en-us/solutions/blockchain/

[2] https://aws.amazon.com/partners/blockchain/

wasted) in order to run the servers and the cooling systems and they found a solution: getting the machines out of the data center. For example at Rutgers University has been build a solar-powered mini datacenter on the building roof[3]. Using a different approach, the Stimergy[4] start-up implements a different solution by moving the data-center in the basement and using the caloric energy dissipated by servers to warm the water that is used in the building.

Conclusion

Each one of these are examples of situations where has been pointed out the fact that the cloud infrastructure although it is popular, accessible, very used and preferred when developing new applications it has some shortcomings. As all the nowadays technologies it suffers a continuous and accelerated development process and is reshaped using other emerging technologies. Blockchain in the cloud is a technology/concept that has great potential to make an impact on the cloud as we know it nowadays.

The strategy is very important if you want a business to have value, so the implementation of new systems is not mandatory if everyone else does it. There are some important aspects to take into account for creating a blockchain via cloud:

- The requirements and core systems that can benefit of blockchain in the organization.
- The benefits that are sought and are related to the core business
- If the current cloud strategy can have blockchain applications
- If the blockchain implementation and applications can connect with the existing cloud end points

[3] http://www.datacenterknowledge.com/archives/2012/05/31/solar-powered-micro-data-center-at-rutgers

[4] https://stimergy.com/en/

Blockchain technology has huge potential and on the long term can transform business operating models with integration of the public cloud. Even if it is very new, it is an important technology that will evolve and expand in the next period so it worth keeping an eye on it.

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