

Piccolo Research

Independent research on blockchain startups and ICO's

An independent review of MultiVAC (MTV)

2 April 2019 (revised from 13 Aug 2018) - Lennard Neo

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MULTIVAC (MTV)

A Customizable Public Blockchain for Industrial-scale dApps

Summary

MultiVAC is creating a public blockchain for industrial-grade dApps. The project adopts a sharding mechanism utilising probabilistic models to achieve consensus. MultiVAC also introduces proprietary technologies that provide high flexibility for developers to dynamically adjust several parameters according to the complexities of their business needs. In short, the team seeks to build a blockchain that is extremely fast, scalable and robust.

Concept

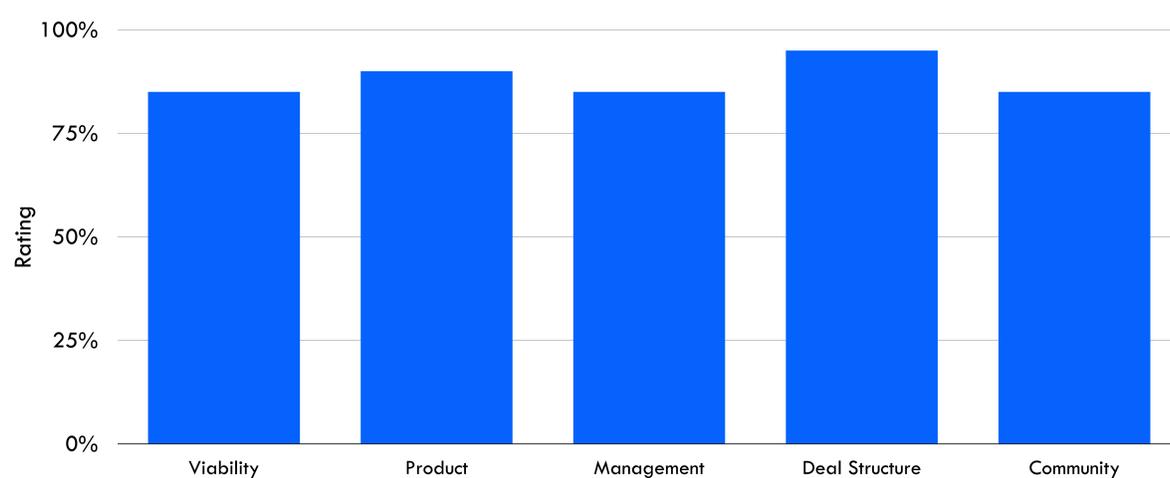
MVP

Established

Updates from the previous report (13 Aug 2018)

- Pico Research rating remains unchanged
- Token sale updates on KuCoin Spotlight
- Updated roadmap and milestones achieved
- MultiVAC launched testnet with 30k+ TPS, previously was only a Proof of Concept
- Sharding Yellow Paper released
- New hires for the team increased from 16 to 23 employees

Birds-Eye View



Buy



General

Ticker:	MTV
Website:	Click here
Sale Period:	3 Apr 2019 10PM (UTC +8)
White Paper:	Click here

Sale info

Pricing:	\$0.006
Accepted:	KCS
Min Goal:	NA
Cap:	\$3.6m
Token Sale %	6%
Escrow:	Yes
Bonus:	NA

Checklist

Management:	✓
Product:	✓
Commercial:	✓
Interest:	✓
Fulfilment:	⚠

Company overview

Incorporated in Singapore, MultiVAC has an objective of developing a high-performance public blockchain. The platform will provide flexibility for users to resolve the blockchain trilemma, allowing them to balance the factors between security, decentralisation and scalability. MultiVAC utilises a probabilistic sharding model combined with a uniquely designed MultiVAC Virtual Machine (MVM) to create a trusted and flexible execution environment. Some fundamental issues the team would like to solve includes:

- The enhancement of security and issues in typical sharding networks without compromising the scalability factor
- To improve the fair and efficient mechanism of node selection by adding an unpredictability layer to enhance the selection process
- To verify the honest execution of computational tasks

Commercial & Technical Strategy

MultiVAC utilises a random sharding technique to achieve higher efficiency and fairness in node selection. This is done without compromising the security and scalability needed for blockchains to achieve industry scale. Furthermore, the MultiVAC Virtual Machine (MVM) is equipped with a proprietary designed blockchain instruction set (BISC) and Proof of Instruction Execution (PoIE) that allow users to decide on the parameters tradeoff between security, scalability and decentralisation. Several noteworthy features include:

- Sharding with Verifiable Random Functions (VRF) – A probability model that is applied to the sharding mechanism, ensuring true randomness, lower cost and higher efficiency in node selection. This function is further enhanced with an unpredictability layer under Verifiable Unpredictable Functions (VUF) to increase the robustness of randomness.
- UTXO (Unspent Transaction Output) and Byzantine Fault Tolerance Mechanism – This methodology combined with dynamic shard adjustment achieves the in-shard consensus of the network, solving the issue of expensive synchronisation costs that exist in current sharding technologies.
- MultiVAC Virtual Machine (MVM) – The platform that supports the flexible execution environment. Two main features are embedded within:
 - a) Proprietary BISC (Blockchain Instruction Set Computer) model, which is a set of instructions bridging the connectivity between the hardware and software.
 - b) PoIE (Proof of Instruction Execution) consensus algorithm uses the Merkle Tree data structure to verify honest execution within the network

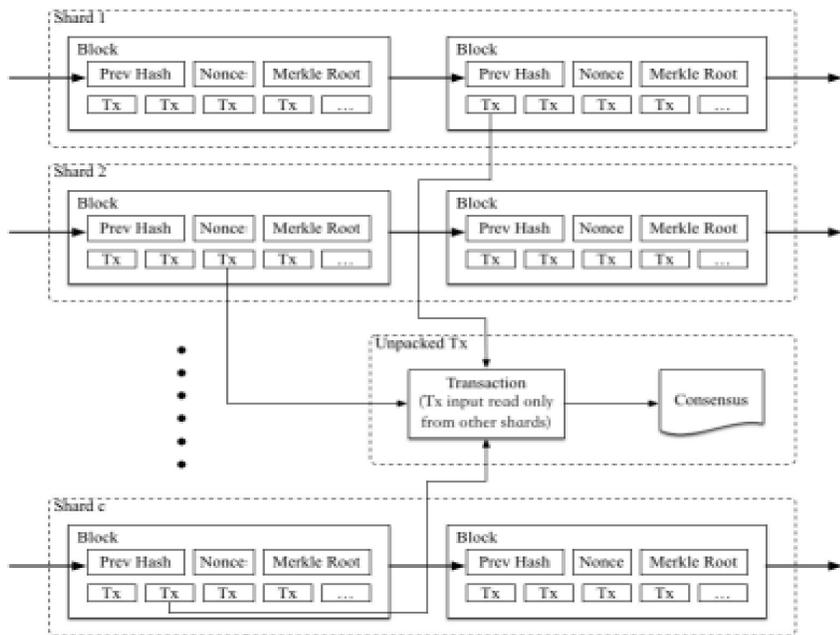


Fig. 2: The UTXO model in MultiVAC. The transactions are distributed into different shards for execution according to the payers' addresses. The inputs to UTXO are transactions that have already been confirmed on other shards, so cross-shard data interactions in our system are all read-only operations.

Figure: MultiVAC UTXO model

Roadmap

MultiVAC has made good progress in both technical and business developments. They have been consistent in meeting the roadmap deadlines albeit a couple of small delays. They have also expanded the team through several new hires and have been busy attending conferences, events, and community meetups to garner exposure for the project.

Roadmap	Developments	Status
Q1 2018	Project Startup & Team Formation MultiVAC Framework design	Completed Completed
Q2 2018	Technical Whitepaper Release UTXO sharding transaction design & development Sharding Ledger & Storage design & development Interactive TX verification design & development	Completed in Jun 2018 Completed Completed Completed
Q3 2018	Sharding Yellow paper release Sharding transaction development In-lab testing and TPS data release	Completed in Sep 2018 Completed Delayed and Completed In Oct 2018
Q4 2018	Testnet release & code open source BISC, MVM, POIE design refine & release	Partially completed and delivered in Feb 2019 Completed
Q1 2019	Testnet iterative & update MVM/PoIE refine & development	Completed Completed
Newly Added	Testnet Wallet Release	Completed
Newly Added	Smart contract purple paper design	Completed
Q2 2019	Full-function union debugging & update Stress testing and security scanning Testnet 2.0 Launch	In Progress In Progress In Progress
Newly Added	Purple paper development	In Progress
Q3 2019	Blockchain wallet and browser release Development toolset, SDK, suites Testnet 3.0 Launch Mainnet 1.0 Launch	
Q4 2019	Testnet 4.0 Launch Build developer ecology	
Q1 2020	Development toolset, SDK	
Q2 2020	Mainnet 2.0 Launch	

Team

The team currently consists of 23 employees with most having research or academic background in various fields.

Frank Lyu (Founder) – Over 7 years of work experience and an expert in data systems. Former CTO of an HR SaaS company Xinrenxinshi, with prior experiences at Meituan and Baidu. He graduated from Tianjin University with a master's in computer science

Dr Shawn Ying (Founder & CTO) – An associate professor in Tianjin University with postdoctoral research experience in computer graphics, parallel algorithm and GPU computing. He obtained his PhD in computer science from Nanyang Technological University and had published over 20 research works.

Claire Wang (Founder & CMO) – Over 5 years of experience. Previously a director of marketing at Xinrenxinshi, co-founder of Julixinfang and Product Manager at Meituan. Claire holds a master's in public administration from Beijing Normal University

Dr Tong Xiao (Algorithm Researcher) – An expert in Bayesian Statistics in dynamic systems and quantitative finance. Dr Tong has 9 years of experience as a researcher with a Hedge Fund and as a Harvard Fellow. He holds a PhD in Statistics from Harvard University.

Dr Sun Hong (Algorithm Researcher) – An expert in AI and a scientist with Microsoft. She holds a PhD in computer science from Tianjin University.

Dr Liang He (R&D Engineer) – Senior software engineer with over 7 years of experience. Prior experiences with Pinterest, Houzz, Facebook and Tencent. He is an expert in distributed systems and holds a master's in computer science from Tianjin University.

Huang Shuzhi (R&D Engineer) – Software engineer with over 6 years of experience. Past companies he worked at include Google, Netease, and IBM. He holds a master's in computer software engineering from Peking University.

Addition team members include:

- 4 Algorithm Researchers
- 7 R&D Engineers
- 6 Marketing & Operations Personnel

Advisors

There are currently 8 advisors for Multivac. Here, we list some notable advisors:

Yang Jun (Advisor) – Co-Founder @ Meituan, Fanfou, Founder @ Huimei Healthcare, Skyline Ventures

Roger Lim (Advisor) – Founding Partner @ NEO Global Capital, Advisor @ Bluzelle, Selfkey, TheKey, Switcheo, nOS, Tomocoin, 0chain

Dr Ying He (Advisor) – Associate Professor @ Nanyang Technological University, Expert in Geometric computation analysis

Johnny Lyu (Advisor) – VP @ KuCoin, Partner @ Phoenix Global Capital

Token Sale

MultiVAC raised a total of \$12.643m (\$4.475m in Seed, \$8.168m in Private) in previous capital raising rounds. Total token supply is fixed with 26.16% allocated for token sale (including seed, private, public rounds) and 30% for the ecosystem.

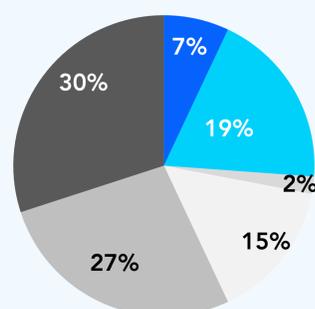
Token Details	Details
Public Sale Date	3 Apr 2019 22:00 hrs (UTC +8)
Sale Platform	Kucoin Spotlight
Token Symbol	MTV
Token Type	Utility
Issuance Platform	Ethereum (ERC20)
Total No. of Tokens	10,000,000,000
Price per Token	\$0.006
Accepted Tokens	KCS
Bonuses	NA
Softcap	NA
Hardcap	USD 3.6m (Investors own 6% if Hard Cap reached)
Market Cap Valuation	USD 60m (Fully Diluted basis assuming hard cap reached)
Market Cap (Based on Initial Cir. Supply)	USD 5.88m
Token Lockup (Investors)	3 months lock, monthly vesting for 12 months (Seed), 3 months lock, monthly vesting for 9 months (Private)
Token Lockup (Team)	1 year lock up and monthly vesting thereafter
Token Distribution	Before 9 Apr 2019 00:00 hrs (UTC +8)

The main token functionalities of MTV are of 2 folds:

- Currency/ payment transaction – MTVs circulated on the network will be used to facilitate fees incurred by platform users
- Staking/ Mining – Users will be able to earn MTV tokens through the PoS mining by depositing their tokens and running MultiVAC's Byzantine consensus

Token Sale Split

- Public Sale
- Seed/Private Round
- Advisors
- Team
- Foundation
- Ecosystem



Investors

MultiVAC has a total of 27 investors. Here, we list several investors:

NGC (NEO Global Capital) - NGC invests in inspiring projects related to blockchain. Past investments include Bluzelle, Zilliqa, Trinity, Fortuna, IHT, Ontology, Dekrypt Capital, mainframe, Switchneo Network, Solana, Ankr, Blockcloud, NKN, Oasis Labs, nOS, Certik

Signum Capital - Signum is a Singapore-based firm that exclusively focuses on blockchain-related companies. The company participates in the early stages of token sales and equity investments. Past investment projects include but not limited to Kyber Network, TenX, Zilliqa, Quarkchain, and aelf

JRR Crypto – JRR is revolutionising a 100-year old investment banking standard by investing in distributed innovation projects. Past investments include Quarkchain, Binance, Merculet, DCC, Aergo

#Hashed - A Korean based entity with an aim to accelerate the global adoption of the blockchain. Prior investments include Icon, Sentinel Protocol, Loki, Quarkchain, Exim Chain, IOTEX

Arrington XRP Capital – A digital asset management firm that invests in blockchain based capital markets. Past investments include AERGO, Spacemesh, BGOGO, Mainframe, NEXO, Telegram, XRP, Certik

Astronaut Capital - A research-integrated asset manager that focuses on pairing fundamental and qualitative research with strategic capital deployment. Past investments include ICON, LendingBlock, Ox, Selfkey, Loki, Current, TrustToken, Quarkchain, Perlin Network, Chromapolis

Community Engagement / Social Media

MultiVAC has hired several marketing employees for their growth team to engage their community. The team has constantly provided updates on Twitter and Bi-Weekly Reports on their Medium pages to highlight ongoing developments. They have also established a mandarin Medium page to engage their Chinese community. Although website traffic based on Alexa ranking has not surpassed previous high, the interest from Vietnam and Russia has been tremendous. In addition, the search on google trends for 'MultiVAC ICO' has increased significantly.

Here are the project social media statistics as per the report date:

- Telegram (English) - 16,200+ members
- Twitter – 6,681 followers
- YouTube – 54 subscribers, 2,700+ views
- Medium – 2,400 Followers

Competitor Analysis

MultiVAC competition within the network of scaling solutions might seem immense, however, peers that utilise sharding technology is relatively fragmented. The most notable competitors are Zilliqa and Quarkchain, which compete in the same sector but their approach towards developing and designing the sharding technology is slightly different, such as the consensus used and the trilemma flexibility.

Project Name	MultiVAC	Zilliqa	Quarkchain
Infrastructure Type	Blockchain Sharding technology	Blockchain Sharding technology	Blockchain Sharding technology
Symbol	MTV	ZIL	QKC
Consensus Protocol	PoE	PBFT	Boson (mainly PoW)
Wallet Support	Web (testnet)	Nucleus (testnet)	qPocket (IOS, Android)
Transaction per Seconds (TPS)	Theoretical: unlimited Practical: 30,784 (Lab Data)	Theoretical: unlimited Practical: 2,828	Theoretical: 1m Practical: 14k (testnet)
Product Stage	Testnet	Mainnet	Testnet
Mainnet Launch	Q3 2019	Q1 2019	Q2 2019
Initiation Year	2018	2016	2017
Current Token Price	\$0.006 (IEO)	\$0.0206	\$0.042
Market Cap Valuation	\$5.88m (based on initial cir. supply)	\$180m	\$39.3m

Figures as of report date, Source: Coinmarketcap

Strengths

- The project offers a solution, allowing developers to customise parameters that persist under the blockchain trilemma, which suits the needs of different dApps in the market
- First of its kind model to implement VRF into sharding, and providing alternative solutions to resolve several issues in sharding technologies
- MultiVAC uses a unique consensus algorithm instead of PoW that is typically found in sharding models
- Strong technical and academic team with extensive research experience to deliver the product
- IEO listing on Kucoin, which is the exchange first could create short-term hype on the project. Past IEO projects listed on other platforms have been successful including BitTorrent (10X ATH), Fetch AI (5X ATH), Celer Network (4X ATH), and Top Network (14X ATH)
- Good deal structure with low hardcap (\$3.6m) and initial market cap valuation (\$5.88m)
- Tangible developments such as 30k+ peak TPS with Testnet release since our previous report

Weaknesses

- Insufficient partnerships have yet to be developed relative to competitors
- A very novel technology idea, but Github code is still private. However, the team released snapshots on the Github code showing developments are in progress with 823 commits and 50,000 lines of code written
- The team's combined years of experience, even though technically strong but lacks depth in commercial and business experience as compared to other projects

Opportunities

- **Providing a customizable solution to resolve the blockchain trilemma** – It is a known phenomenon that blockchain must scale to enhance adoption of the network. However, scalability has its limitations known as the blockchain trilemma. Networks, in general, suffer from this flaw as infrastructure projects typically have to choose between 2 of 3 factors that include Security, Scalability and Decentralization. Some projects that give up security are Zilliqa and Dfinity; those give up scalability are Bitcoin and Ethereum; and one that gives up decentralisation is EOS. Hence, the flexibility to select various factors to suit varying project needs presents an explicit opportunity in this area.

The Blockchain Trilemma

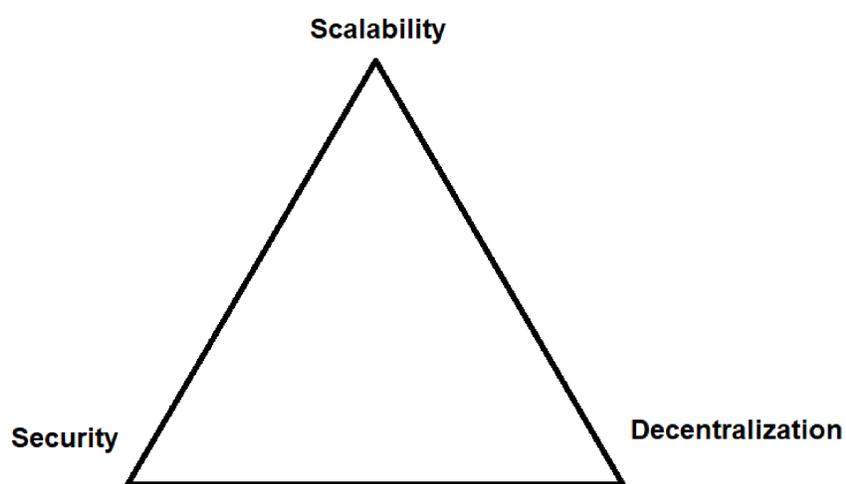


Figure: The blockchain scalability trilemma where only 2 of 3 factors are viable

- **Enhancement of current sharding models** – Sharding in itself can become technically complicated given its complex infrastructure nature. This could take a heavy toll on multi-shard operations, which cause the network to incur expensive costs when shards are synchronised. MultiVAC could seize this opportunity, as computational tasks on their platform are only executed over a small number of nodes while still retaining network robustness.

Threats

- MultiVAC comes after successful project launches such as Zilliqa, Quarkchain, Dfinity. As they are a 3rd or 4th market entrant, adoption is still uncertain, and it could be difficult to get a significant slice of market share.

Conclusion

Piccolo Research re-iterates its 4.5 stars and favourable '**Buy**' rating on MultiVAC. The project has a unique value positioning to offer a flexible solution in tackling the trilemma issue of blockchain scalability. Aside from this, they are the first to implement a verifiable random function in sharding technology, and concurrently working on a solution to enhance the limitations in sharding.

Overall, for the reasons listed, Piccolo highlights several reasons to affirm our rating:

- A unique value proposition to create a customizable platform suitable for various dApps projects
- A well carved out consensus algorithm that complements their sharding model
- Tangible developments noted since the previous report with 30k+ TPS (higher than its competitors) and the launch of testnet
- First IEO listing on KuCoin creates hype and provides short-term potential strength for the project
- Good token sale deal structure with low hardcap and initial market cap valuation

Notwithstanding the above, Piccolo acknowledges several concerns regarding MultiVAC. The project lacks established partnerships that could hinder future adoption. In addition, the team does not possess strong commercial experience, but valuable relationships with strategic investors have mitigated this impact to an extent.

In light of the preceding, Piccolo Research affirms a '**Buy**' rating on MultiVAC.

About the Analyst

Lennard specializes in fundamental and technical analysis in digital asset investments. He became acquainted with blockchain, cryptocurrency and ICOs in 2016, and recently decided to take a meaningful step away from traditional banking to join this industry. Previously, Lennard spent 3 years with an investment bank in forex and debt capital markets. Prior to this, he also had entrepreneurship experience working with an e-commerce startup and a local social enterprise. Lennard graduated with a master's degree in Applied Finance and is fluent in English, Chinese with a basic in Korean. He is a CFA level III candidate.

Ratings Definition

Monitor – Continue observation until clarity of information is provided

Sell/ Avoid – Investment is associated with high risk of losing capital

Hold/ Neutral – To maintain current levels of position until the next updated release

Spec Buy – A speculative opportunity for investors with higher risk tolerance

Buy – A high conviction buying opportunity

Disclaimer

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