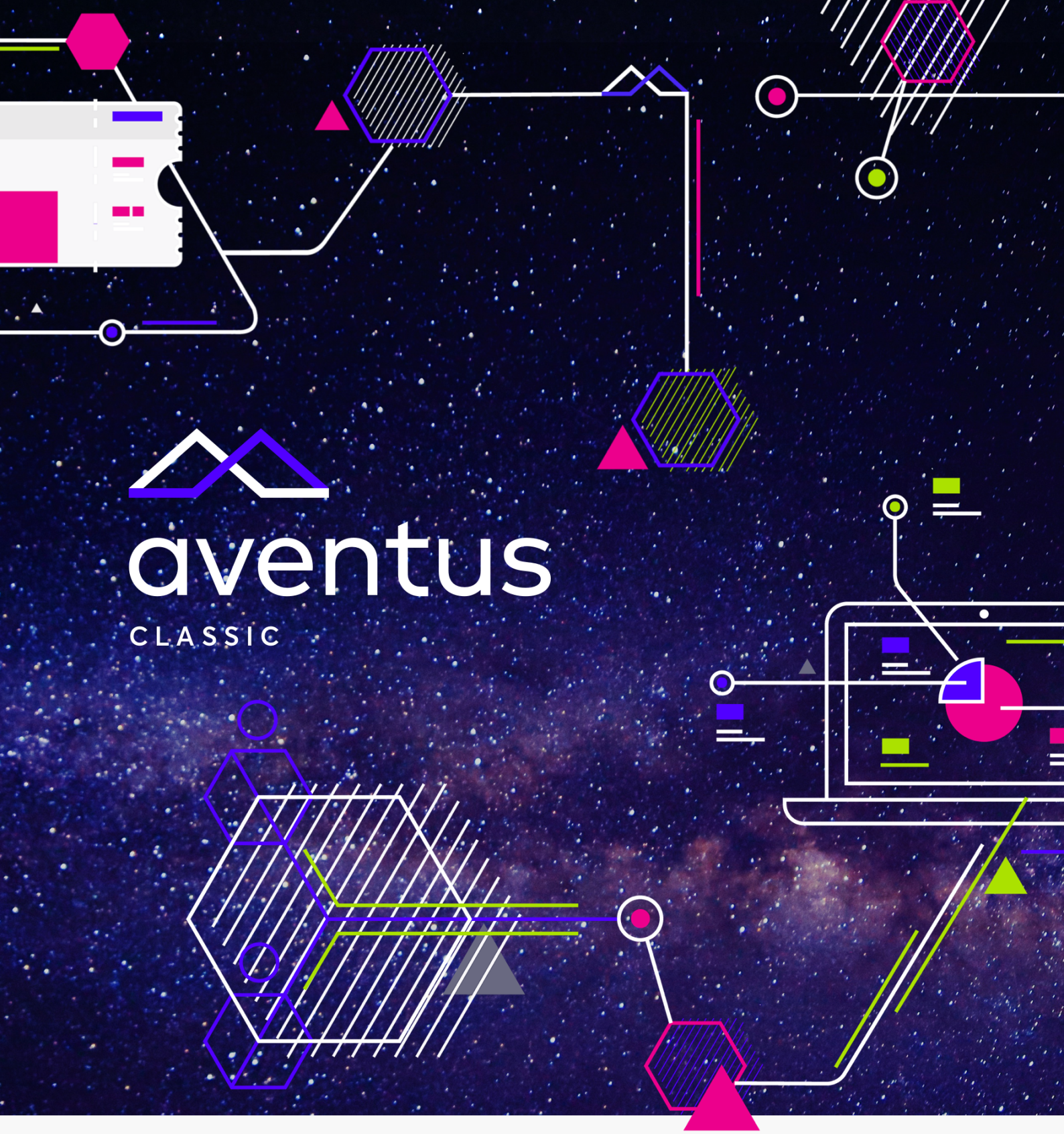


Aventus Classic Whitepaper

September 2019 | Version 1

Introduction

Overview

Aventus is an open-source, decentralised protocol that revolutionises the way digital assets are issued, owned, and transferred across supply chains.

As envisaged in the original Aventus white paper *A Blockchain-Based Event Ticketing Protocol* (2017), Aventus Classic is an Ethereum-based ticketing protocol designed to alleviate fraud and touting in the long tail of the event ticketing industry.

History

Aventus originally set out to build a protocol for blockchain ticketing on Ethereum, with the purpose of solving problems concerning fraud and duplicitous behaviour in the supply chain. Its mission was tripartite: to improve oversight and control over tickets, to facilitate lasting communication between ticket owners and rightsholders, and to promote the standardisation of tickets and their lifecycle across the entire supply chain in order to reduce costs.

While Ethereum's inherent security standards and independence from corporate interest presented the perfect platform for Aventus' solution, problems with scalability and privacy meant that it was insufficient to service the ticketing industry. At the time, however, the Ethereum roadmap was set such that these issues would be solved in the coming year, and hence it was assumed that by the time a version of Aventus was released publicly these points would be moot.

Unfortunately these milestones were not met, meaning that the scope of the Aventus protocol had to change in order to deliver its proposed solution. Aventus, therefore, began work on the Aventus Network, a layer 2 solution designed to achieve the required levels of scale and privacy on Ethereum without compromising on native security and independence. During the exploration and subsequent expansion of the protocol, it was discovered that this layer 2 solution also solves problems ingrained within other aspects of commerce including loyalty, vouchers, financial assets, and virtual goods, i.e. any industry or supply chain focused on digital assets.

Nevertheless, during initial development significant progress was made on a solution that could satisfy a large proportion of the event ticketing industry, specifically the long tail (events that sell tickets at a maximum rate of 100 tickets a second). Thus Aventus Classic was born; an Ethereum-based protocol that decentralises the event ticketing industry and tackles fraud in the secondary ticketing market in accordance with the original Aventus white paper.

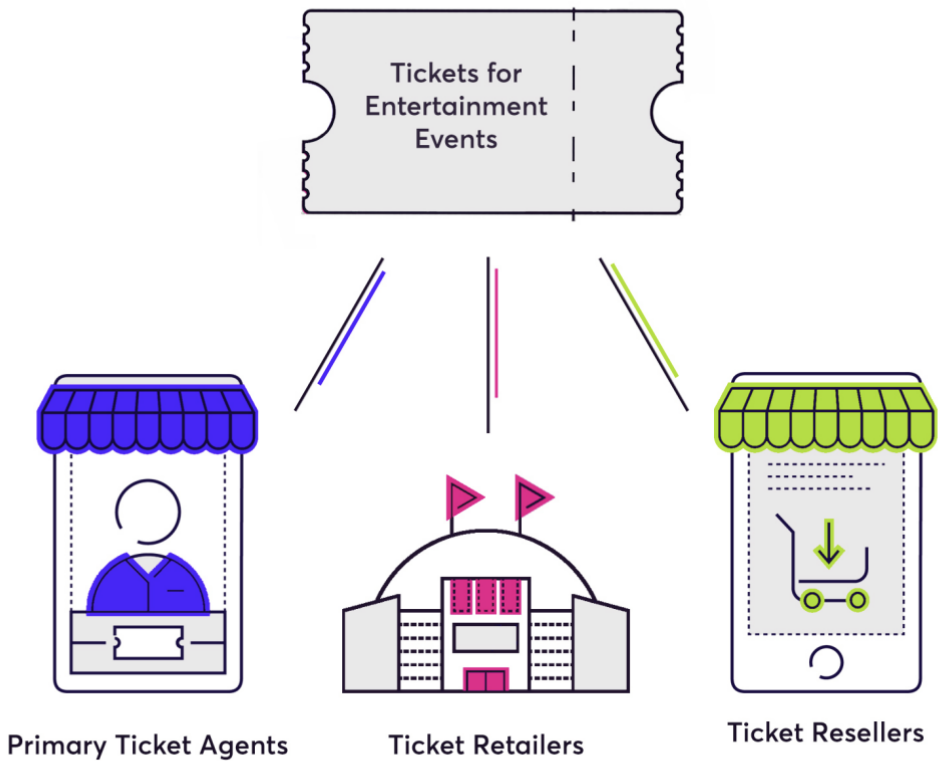
Problem

Industry Overview

Tickets for events are typically available to purchase via numerous sales channels or sellers. The ticketing industry defines three high-level categories of seller:

1. ticket retailers (usually the event organiser with direct responsibility for an event: for example a venue, promoter or club, selling tickets directly to consumers);
2. primary ticket agents (appointed by an event organiser to sell tickets to consumers on their behalf);
3. ticket resellers (who source tickets from retailers, agents and other resellers to sell on to consumers).

A ticket sold for the first time is a primary ticket sale. A ticket resold by an individual, secondary agent, broker or other party is considered a secondary ticket sale (though the term 'secondary' is misleading, as a ticket may theoretically have passed through any number of hands before it reaches the person who actually attends the event).



Such seller structure has caused the global ticketing landscape to become complex and fragmented. Not only does it depend upon multiple interactions within the ticketing ecosystem (event organisers, venues, promoters, bookers, primary and secondary agents), but standard practice between these parties often differs between geographies. In the US, for example, venues typically control the inventory for an event, whereas in Europe this typically falls within the remit of the promoter. Exclusivity is rare in the UK, with ticketing inventory split between the venue and the promoter, each of whom will have their own preferred agent(s). Practices also differ depending upon event type: for example, sporting teams often own the venue and will control their own ticket sales.

Within the primary market, inventory rightsholders usually control the ticket price, revenue-splits and methods of distribution (e.g. to select groups via third parties, with certain promoters or through certain outlets such as TicketMaster)[1]. Prices are set in a variety of ways including at a fixed value, in an open auction, or using dynamic pricing based on demand on a per-seat basis. Tickets are often sold below market value so that artists can increase customer loyalty and prioritise fan experiences, or because event organisers and promoters prioritise revenue through in-event advertising and merchandise sales[2], for example.

The secondary market exists to facilitate the resale of tickets originally purchased on the primary market. It allows buyers and sellers to come together in order to transact, often via a resale marketplace (see TicketSwap or StubHub as examples). While often pilloried by the media and consumer watchdogs, the secondary market fulfils a necessary function by affording greater consumer choice. In fact, in his 2016 UK government-led review of the secondary ticketing market, Professor Michael Waterson concluded that "consumers and the economy benefit in various ways from the existence of a well-functioning secondary ticket market[1]."

Although pricing dynamics within the primary market do directly affect the volume and transactional-value in the secondary market, ticket pricing is far more demand-driven on secondary platforms, with tickets defining their own market value. These secondary platforms profit by taking a percentage of secondary sales (typically around 25-30%[1]). Allied with the high market value for 'big ticket' items, this means that secondary platforms tend to enjoy higher margins per ticket than primary platforms.

To take advantage of these higher margins there is a growing trend for primary agencies to launch their own affiliated secondary markets (Ticketmaster's GetMeIn, for example), further complicating the already fragmented landscape. Primary agents with their own secondary platform, or that have integrated with an external resale platform, also benefit from greater control and transparency over ticketing transactions.

Key Issues

From issuance to redemption, the ticket lifecycle is highly disjointed. This has produced three major pain points:

1. A lack of control and oversight.

   Once a ticket leaves a given entity's touchpoint in its lifecycle, it is unlikely that that entity has oversight over who subsequently owns the ticket or how it moves around. This means that they have less customer data with which to optimise purchase behaviour and drive revenue, and they cannot enforce rules set by the artist, for instance.

2. A lack of trust and standardisation.

   Negotiations over inventory allocations, rights to resale, etc., are contentious and inefficient due to the lack of trust between entities in the supply chain. This has led to a lack of standardisation. Every entity has their own definition, databases and digital

representation of tickets and their exchange, which makes communication between organisations difficult. This also makes it hard for new market entrants to participate in, and add value to the sector.

3. Constrained innovation.

   The industry suffers from a "build or buy" mentality. Rightsholders and, more generally, ticket operators are reluctant to engage with the third parties creating services around their tickets (e.g. resale platforms) since they lose control and do not fully benefit from the activities. Thus, innovation only truly occurs within silos and is constrained to an individual organisation's ability to realise (or acquire) new ideas.

Solution

An Overview of Aventus Classic

Aventus Classic is a smart contract system on the main Ethereum blockchain that envisages a completely decentralised ticketing industry. It requires AVT token holders to function as compliance officers, performing due diligence on new events and new supply chain participants (such as event owners, and primary and secondary market vendors).

All source code and documentation is available on GitHub: https://github.com/AventusProtocolFoundation and is deployed on the Rinkeby network at the following address: https://github.com/AventusProtocolFoundation/protocol-classic

How it works

Aventus Classic was built specifically for ticketing and is comprised of 3 main elements: membership, event creation and ticketing.

Members

A deposit of AVT must be staked in order to become a registered member of Aventus Classic. This applies to both primary and secondary agent roles, and functions as a deterrent to fraudulent behaviour. Anyone staking enough AVT can challenge a member and make a case to the whole Aventus community as to why that individual/organisation should no longer be a part of the network. The challenger must add a deposit to match the stake put up by the challenged. This initiates a vote in which all holders can participate (the mechanics are identical to those described below in the *events* section). If a challenge succeeds, the individual/organisation is banned from Aventus Classic and their deposit retained and redistributed.

Events

For an event to be registered, a user must pay the event-creation deposit and upload the event's details, including:

- an event description
- an event time

- on- and off-sale time
- the average ticket price (ATP) in cents

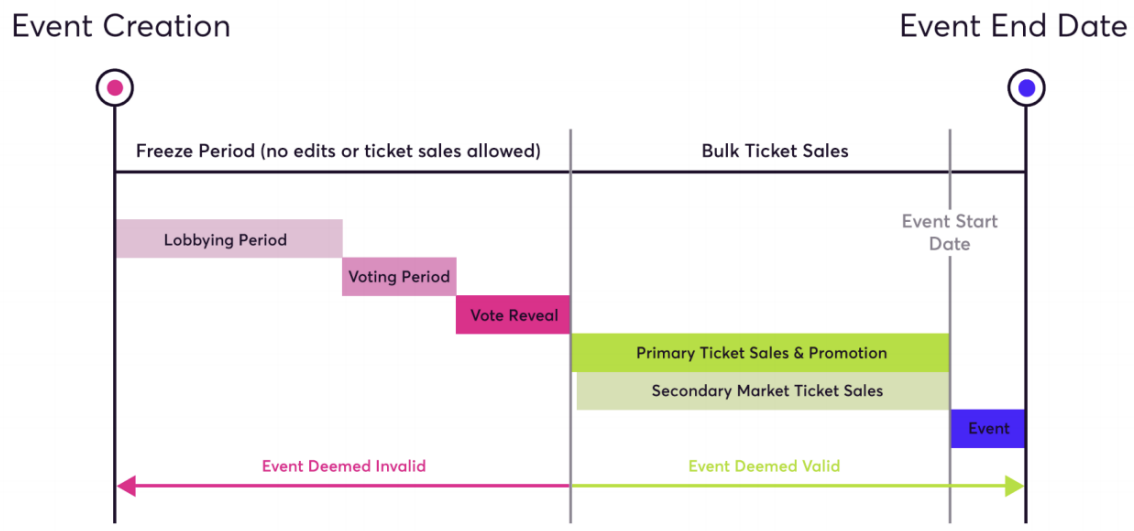
The ATP is used to calculate the size of the AVT deposit; for a free event the deposit is 1000 AVT. For a paid event the deposit is 2000 AVT.

Before tickets can be sold, a reporting period occurs during which the event can be challenged and a community vote initiated. This initial period is designed to prevent fake events going live on the network and prevent sellers from setting incorrect ATPs. Events can also be challenged after the initial reporting window.

The voting process works as follows:

1. A deposit of AVT matching the event owner's deposit is put up to initiate a vote.
2. Votes are confidentially cast by the Aventus community by staking AVT.
3. When the challenge has ended, the winning party's deposit is returned and the losing party's deposit is distributed among the winning voters proportional to their stake.

The full life-cycle of an event is depicted below:



As per standard industry T&Cs, the event creator retains ultimate control over the event. They can cancel the event at any time, revoke tickets, refuse entry to anyone they wish, and stop sales at will, all of which is built into the protocol. The event creator can also define a series of addresses associated with ticketing agencies and resellers on Aventus Classic for the purposes of selling and refunding tickets.

Tickets

When the event has been deemed valid, tickets are registered on the Ethereum blockchain via the protocol. A hash, encoded with the specific details of that ticket, e.g. ticket type, seat number, etc., is generated for each ticket and is associated with the public key of the ticket owner. A ticket can then only be transacted (e.g. from event organiser to primary vendor, or from primary agent to consumer) with the consent of both parties via their digital signature on

the blockchain. Once a ticket has changed hands, the hash of that ticket is then re-associated with the public key of its new owner.

When it comes to a secondary transaction there are three parties involved: the current owner, the recipient, and the secondary vendor or reseller who facilitates the transfer of ownership between the other two entities.

A variety of access control solutions can be implemented on top of this process, the simplest of which uses the digital signature to prove the attendee's ownership of the public key, and thus the associated ticket. The protocol supports a wide variety of access control needs, giving event organisers and venues critical choice and control. If identity validation requirements are required on the door, e.g. facial recognition, voice analysis or fingerprinting, this information can be tied to the ticket owner's public key.

Conclusion

Product Market Fit Evaluation

Aventus Classic achieved our original goal of producing a product that solves issues within the ticketing industry. From the outset we believed that either Ethereum, or a competing blockchain, would solve the challenge of scaling and privacy, but we were conscious that if this did not happen by the time Aventus Classic was ready, we would have to build our own solution to address these concerns.

As it turned out, these issues have not been addressed within the underlying blockchains themselves, including Ethereum on which Aventus Classic is built, and as such the applicability of Aventus Classic has limitations. Simply, the Ethereum network cannot directly handle the required scale, and there are concerns over making sales volumes and ticketing allocations publically available.

Despite these challenges we believe there are still use cases for the solution as originally envisaged. As such, we have released all Aventus Classic source code under a permissive open-source licence, to encourage the decentralisation of the ticketing industry with the support of the open-source community.

Looking to the Future

In H2 2019, the first version of the full Aventus PoA Network and white paper will be released. This will address the prevailing issues concerning scalability and privacy in Aventus Classic, and extends the commercial applications of Aventus to further encompass general digital assets.

Bounty Program

Aventus Classic is the company's initial release, and the first interaction with the open-source community. To encourage innovation, the Aventus Protocol Foundation is hosting a bounty campaign with a pot of $15,000 for the completion of a blockchain-based ticketing system (including a ticket selling app, a ticket wallet, and access control app) built on Aventus Classic.

The winning build will be used as a ticketing platform by various committed parties. For more information, please visit HERE

References:

[1] Waterson, M. Independent Review of Consumer Protection Measures concerning Online Secondary Ticketing Facilities. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/ attachment_data/file/525885/ind-16-7-independent-review-online-secondaryticketing-facilities.pdf 2016. Online; Accessed 25 Jun. 2018.

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[3] Fischer, A. Towards better Ethereum voting Protocols. https://blog.colony.io/towards-better-ethereum-voting-protocols-7e54cb5a0119, 2017. Online; Accessed 25 Jun. 2018.