Swash Whitepaper

Reimagining Data Ownership

Incentivised Data Flows for Web 3 Data Solutions

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Abstract

This paper presents Swash. Swash is an environment and toolset where individuals, businesses, and developers can unlock new incentivisation mechanisms. It aims to rebalance the data economy in a user-centred, privacy-preserving way. It helps people take ownership over their data and to receive income from the profits it generates, developers to innovate a new generation of data solutions, and businesses to access high-quality data without intermediaries. The Swash ecosystem is built on the premise that, by recognising and incentivising all actors, it can rebalance value and redefine standards to create a better, more sustainable data economy.

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1. Introduction

People do not have ownership over their data: they are unable to control what happens to it; how it is collected, used, and sold, and do not receive any of the profits it can generate. They lack the technical capabilities to regain control and to get remunerated for their contributions, leading to a lack of balance and an extractive approach to data collection.

On the other hand, businesses, like advertisers and brands, market intelligence and analytics companies, AI/ML startups, hedge funds, and agency networks, currently pay for expensive, low-quality data that is collected without user consent or knowledge. They are burdened by data silos, slow and expensive intermediaries, and wasted resources on advertising fraud and bots[1].

Developers, like data scientists, struggle to access large amounts of high-quality data and spend approximately 45 percent[2] of their time cleaning bad quality datasets. These resources could be spent on innovation, which would be an estimated six times faster[3] with improved access to data sources. Tech entrepreneurs are limited in their ability to communicate with their users and reward them for their contributions. They also lack access to a developer's environment that caters to their needs at different stages of creation.

The data industry is immense. According to the European Commission, the global data economy is pegged at $3 trillion dollars[4]. The majority of the world's most valuable companies are technology companies like Facebook, Amazon, Alphabet, Microsoft, and Apple whose business models rely heavily on the use of data for insights and advertising[5]. The amount of data available is also growing at a rapid rate due to increasing digitisation and the prevalence of embedded devices. With every individual creating an estimated 1.7MB of data every second[6], it comes as no surprise that the global datasphere is expected to grow to 175 zettabytes by 2025[7].

Currently, a small number of companies hold enormous market share in the data sector, with SimilarWeb, Nielsen, and ComScore dominating the industry[8]. Despite their high value, these companies are vulnerable to collapse if it is revealed that their data is collected outside current consumer privacy norms. They are also highly vulnerable to new privacy regulations, which render existing data sources unusable, as seen with the collapse of $180 million giant, Jumpshot, in January 2020[9]. The Jumpshot--Avast scandal remains a prime example of the power of reputation and transparency. It also underlines the market demand and urgency for solutions with the same level of insights and granularity, only with more sustainable business practices.

However, the role of data cannot be ignored. Data analytics can be used to influence societal behaviour in many ways, including everything from advertising to elections, and people are

[1] https://www.cheq.ai/adfraudcost
[2] https://www.anaconda.com/press/anaconda-releases-2020-state-of-data-science-survey-results
[3] https://www.edge.org/response-detail/26587
[4] https://www.weforum.org/agenda/2017/09/the-value-of-data/
[5] https://human-id.org/blog/faangs-out-what-big-tech-wants-with-your-data/
[6] https://www.domo.com/assets/downloads/18_domo_data-never-sleeps-6+verticals.pdf
[7] https://www.idc.com/getdoc.jsp?containerId=US46410421
[8] https://www.owler.com/company/similarweb
[9] https://www.vice.com/en/article/qjdkq7/avast-antivirus-sells-user-browsing-data-investigation

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increasingly concerned[10] about how their data is used. As a result, regulations like GDPR and CCPA attempt to protect individuals by introducing standards over the way data is processed. This, as well as restrictions on third-party cookies[11], pushes businesses towards solutions that are driven by privacy and transparency.

Although regulation and legislation seek to protect the privacy of individuals, it has limits. The current data economy, albeit vast and rapidly evolving, is not the only model that exists. It is possible to enjoy the benefits of living in a data-driven world without needing to be concerned about data rights by leveraging the power of community-driven structures and decentralised technology. In his book, *Who Owns the Future?*, Jaron Lanier proposes a new model in which everyone who contributes data receives fair remuneration. He stresses the urgency of solutions that serve the interests of the masses and explores the functionality of such a system for driving a better, more dignified internet[12].

Technologically, this is a complicated ask. However, Web 3 and decentralised technologies make it possible to reach an Internet of Ownership through smart contracts, micropayments, and trustless governance. Swash was born from this evolution, seeking to rebalance and set new standards for the data economy through individual data monetisation and fair revenue distribution.

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[10] https://www.forbes.com/sites/forbestechcouncil/2020/12/14/the-rising-concern-around-consumer-data-and-privacy/
[11] https://blog.hubspot.com/marketing/third-party-cookie-phase-out
[12] https://www.simonandschuster.com/books/Who-Owns-the-Future/Jaron-Lanier/

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2. What is Swash?

Swash enables the next generation of data solutions through new incentivisation streams and a collaborative development framework, governed by the ethos of Web 3. It enables individuals, developers, and businesses to cultivate new realities of data ownership and value creation.

For individuals:

- Regain ownership and receive passive income as they surf the web
- Collectively invest value of data into social development
- Exchange data value for alternative ecosystem benefits

For businesses:

- Access high-quality, zero-party[13] data at scale
- Save time and money by eliminating intermediaries and reducing ad fraud and bots
- Improve the reputation and sustainability of business practices

For developers:

- Accelerate innovation due to improved access to diverse data
- Be part of a new generation of data solutions
- User acquisition through incentivisation mechanics and communication

2.1. Vision and Key Principles

The Swash browser extension was created in 2019 as an example of the world's first digital Data Union, built on Streamr[14]. The Swash community has grown rapidly since its launch at London MozFest[15], amassing over twenty-five thousand users worldwide at the time of writing, attended industry events such as the World Ethical Data Forum 2021[16], MyData Online 2020[17], ETHDenver[18], and Diffusion Digital[19], and with features across various media publications such as Harvard Business Review[20], Forbes[21], CoinDesk[22], CoinTelegraph[23], and Hackernoon[24].

Swash takes a research-based approach and has conducted[25] and participated[26] in several studies in the emerging realm of data ownership and data monetisation, including the likes of leading data research initiatives like Mozilla Foundation and Aapti Institute.

[13] https://go.forrester.com/blogs/straight-from-the-source-collecting-zero-party-data-from-customers/
[14] https://streamr.network/case-studies/swash/
[15] https://youtu.be/_yo6iTH1FE0
[16] https://worldethicaldataforum.org/
[17] https://online2020.mydata.org/
[18] https://youtu.be/kfdBGSzET98
[19] https://www.crowdcast.io/e/diffusion-digital-september/19
[20] https://hbr-org.cdn.ampproject.org/c/s/hbr.org/amp/2020/01/why-companies-make-it-so-hard-for-users-to-control-their-data
[21] https://www.forbes.com/how-decentralization-could-alleviate-data-biases-in-artificial-intelligence/#4aeb649a5248
[22] https://www.coindesk.com/data-is-labor-why-we-need-data-unions
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[24] https://hackernoon.com/5-web3-startups-that-are-pushing-boundaries-wb2s3yi3?source=rss
[25] https://medium.com/streamrblog/how-to-market-a-data-union-49906ec9e873
[26] https://foundation.mozilla.org/data-for-empowerment/what-helps-the-ecosystem/who-needs-alternative-data-governance

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"For demand to increase, we have to have really killer apps, something I want to do and share with my friends and family so that they do it… Talking about the philosophy of why it's better is not going to cut it." — Mozilla Data Futures Lab

By enriching users, Swash is the first step towards a new, more dignified internet[27]. It redefines how data is collected and valued, balancing the power dynamic between online platforms and the people they serve. Swash makes more of what already is by providing a simple and easy way to passively earn, innovate, and create a fairer world and better, more equitable internet.

Powering the Swash universe will be our native token (SWASH). Wherever there is a need for a transaction, such as in marketplaces, to purchase data via the sIntelligence platform, or to pay sApp members for their efforts, the SWASH token will be used. This will also be integrated with our constellation of partners and their native currencies, allowing for cross-fertilisation of value, increased adoption, and seamless user experience.

To align the mission of Swash with the overarching needs of the broader data economy requires understanding the concerns of each participant and the different incentivisation models that support their involvement. The Swash ecosystem is built on four key principles:

- **Incentivise**: Provide a way for users to get paid for the value of their data and to put it to good use through collective investment in social organisations
- **Access**: Improve access to high-quality, zero-party data for businesses and data scientists
- **Build**: Encourage developers and entrepreneurs to join a new generation of data solutions
- **Collaborate**: Work alongside ecosystem partners to allow for interoperability and mass adoption at scale towards a wider vision for the future of data

These core principles will underpin all development and innovation that takes place in the Swash ecosystem. The following section of this whitepaper introduces the various participants, applications, and services within the Swash world and explores some of the potential applications and technological structures that will be built with these principles in mind. Furthermore, when collaborating with external partners, developers, and innovators, these principles serve as a foundation to ensure that all participants in the Swash network are motivated by the same vision; to rebalance the digital economy by giving more to everyday internet users.

[27] https://youtu.be/Np5ri-KktNs

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3. Swash Elements

Before introducing some of the concrete use cases Swash will develop, we will introduce the various actors and their roles within the platform.

- **sMember**: These are people who have installed one of the Swash sCollectors and, therefore, joined the Swash Data Union in order to receive income from and gain control over their data.

- **sCollector**: sCollectors are applications that are installed by Swash users (sMember) to capture, pool, and sell data on their behalf. The Swash browser extension is one example, but it could also be a desktop or mobile application, or an independent browser.

- **sCustomer**: sCustomers are people who buy Swash data through marketplaces or subscribe to the Swash business intelligence platform (sIntelligence).

- **sIntelligence**: The sIntelligence platform is a web-based application that shows companies basic and competitive metrics about their industry sector.

- **sApp**: sApps are third-party applications built on top of the Swash core (sCore). They can use computation infrastructure (sCompute) to run algorithms on customised Swash datasets and use the Swash channel service (sChannel) to interact with Swash users (sMembers).

- **sUser**: sUsers are people who authorise the use of sApps. sApps may provide an added revenue stream for sUsers in exchange for their interaction with the sApp. sUsers will likely be sMembers who are invited to use sApps.

- **sChannel**: sApps can use Swash SDK to communicate with sMembers using the sChannel feature. They could use this feature to ask for more information from sUsers in exchange for revenue, such as through polls or questionnaires.

- **sClient**: Companies that use sApps to pay for application services are sClients. This might include a website that publishes through a sApp or an advertiser who displays advertisements through a sApp.

- **sCore**:This is the term used to describe the three main elements of the underlying Swash architecture; Data Fabric, Analytics and Marketplace Module, and Applications and Services Environment.

- **sChain**: Swash uses a custom-built side chain called sChain to record all activities of sCore and fuel data access control and revenue distribution.

- **sPortal:**The sPortal is a web-based application that clients can use to communicate with sCore.

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- **sCompute**: By using sCompute, data scientists and developers can run computation tasks on Swash data without needing to access or move the dataset.

- **sService**: sServices can be used by sApps and external customers. These include bot detection, captcha, and a sApp measurement service.

- **sRevenue**: All revenue received is shared fairly and transparently between all actors using sRevenue.

- **sVault**: All income from across the Swash ecosystem is received by sVault. It is from here where redistribution happens fairly and transparently using Swash smart contracts.

4. First Wave Solutions

This section will present several concrete use cases of the Swash ecosystem, although it should be noted that these examples are by no means exhaustive. Rather, they fulfil the purpose of sharing our initial use cases while igniting curiosity and innovation among the four main players addressed. It should also be noted that, while these examples are presented with the purpose of indicating the value Swash brings to these specified actors, the interconnectedness and synergy between the Swash platform and those it seeks to serve will overlap in many ways. We also envisage that the role and relationship between the various actors will continue to evolve as the platform grows and the industry develops.

As an ecosystem facilitator, Swash has already and will continue to build these use cases to provide tangible examples to the larger community of developers, people, and businesses. For some examples mentioned, specifically sApps, we encourage other innovators to join us in developing a harmonised data universe.

4.1. Data Union (DU)

Data Unions are structures that work to manage and protect the interests of those within the DU, much like a trade union or credit union, but for data. This means that the people within the Data Union (sMembers) have greater power and control over how their data is collected, accessed, and used while receiving a share of profits generated.

The term ‘Data Union’ is analogous to ‘Data Trust’ or ‘Data Cooperative’ as a formalised collective model. This has already been adopted by European regulators, with the EU Data Governance Act and Digital Markets Act working to benefit this ecosystem through grant funding, legitimacy, and regulation. As suggested by James Felton Keith[28], Data Unions can play a role in policy, law, and technology:

[28] https://www.coindesk.com/data-is-labor-why-we-need-data-unions

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Data Union as a Policy is a method of insisting that cooperatives of data subjects (individuals) exist by elected officials and governmental bodies.

Data Union as a Lawsuit is a method of data subjects suing data users (institutions) for redress in scenarios where there are claims by individuals for indemnification.

Data Union as Tech is a method of embedding technologies that create a distribution mechanism for rightful compensation based on transactions between data subjects and users.[29]

Data Unions are rooted in the belief of “Data as Labor” (DaL). Coined by Eric A. Posner and Glen Weyl, DaL exists in a world where data is as dignified as work and, therefore, should be compensated accordingly. This, Posner and Weyl believe, could restore the balance of power and wealth and ensure that the interests and needs of everyone - not just Big Tech - are met.

Data Union developers include anyone; individuals, teams, or companies, who want to build their own Data Union. Data Union members (or sMembers) include anyone who wants to profit from or regain agency over their data by joining a Data Union. For the Swash browser extension, sMembers are those who have installed and use the extension.

Data Unions offer a means for people to leverage collective action and power in a way that recognises their autonomy and contributions as individuals within a larger body. The Data Union is where captured data is pooled together. Then, when businesses buy the data, smart contracts automatically redistribute profits back out to the members within that Data Union. For the Swash browser extension - the first and largest Data Union - 70 percent of profits are redistributed back to members.

By rewarding people for the value of their data, it allows people to earn as they surf the web, enabling individuals to practice their data rights while celebrating their role as essential value providers in the digital economy. This, in turn, sets new standards and reshapes the data economy by providing an alternative solution that works for the majority, not the few.

“Large-scale industrialisation led to workers forming labour unions, while the power of the banks led to credit unions. To avoid data being concentrated in the hands of powerful corporations and governments, we need data unions to empower communities to understand data and control its use. It’s about moving away from centralisation of data to distributed control. We have the community-level data now to allow that to happen.” — Alex Pentland, MIT

4.2. sIntelligence

Businesses (i.e. sCustomers) need insights about their industry, market, and competitors to stay informed and get ahead of their competition. The demand for market intelligence is growing in every sector as businesses struggle to keep up with new advancements and their impact. In contrast, smaller companies need ways to benchmark their growth. However, the

[29] https://www.coindesk.com/data-is-labor-why-we-need-data-unions

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current Competitive and Market Intelligence (CMI) landscape is broken. It is dominated by a few key players who are increasingly susceptible to regulatory pressure and sentiment around data rights and sustainable data collection and usage.

Swash's sIntelligence platform provides unique, unrivalled business intelligence in a consistent, reliable way, providing businesses with a competitive advantage in their sector. It is a web-based platform that uses aggregated Swash data to show companies metrics like:

- Demographic composition
- Cross Visitation
- Basic upstream and downstream metrics
- Aggregated Search + Click reporting
- Unique Page Views at the domain level
- Market Share at the sub category/ SKU level
- Channel conversion rates
- Price sensitivity / monitoring
- Consideration Sets
- Basket Value

The sIntelligence platform can be used for things like improving SEO rankings, discovering market and industry trends, and understanding relevant analytics to better connect with audiences.

They can also see daily, weekly, and monthly global market trends, filtered by country or region. sCustomers can tailor their sIntelligence dashboards and generate custom market reports which can be kept private or made publicly available. The data that fuels the sIntelligence platform is Swash data. This means that, when sCustomers pay for a subscription to access the sIntelligence platform, profits are redistributed back to contributors.

4.3. sApps

Developers who want to be a part of the next generation of data solutions can join the Swash ecosystem by building Swash applications (sApps). sApps have many uses and can come in a variety of forms, but are aligned by the ability to redistribute profits and other compensation back to users of sApps (sUsers). sApps can communicate directly with sUsers through sChannel to get to know sUsers better and provide another revenue stream, such as by answering questions or polls.

The sApp solution provides tech entrepreneurs and developers with the infrastructure and services they need to grow. To present the diversity of sApp architecture, Swash will build the first genesis of sApps, which are outlined below:

- **sAd**: The Swash advertisement platform (sAd) leverages sCore capabilities to create a fair, transparent, and efficient advertising platform. Advertisers (sClient) can create a campaign to target sUsers, delivering an ad to the individual who will have already opted-in to sAd for the chance to increase their revenue streams. sAd measures

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whether an impression or click was made, which will trigger a smart contract to redistribute revenue among sUsers based on the records within the smart contracts.

- **sPoll**: Polls and surveys are important market research tools and can be used by businesses to better understand their audience sentiment and to gather more granular insights from participants. However, people lack the incentive to fill them in, meaning they can be costly and ineffective for businesses. With sPoll, sUsers can opt-in to receive polls and surveys to complete, allowing them to receive extra revenue opportunities while sClients gather valuable, zero-party insights from their target audience. Once sUsers have completed a poll or survey, the data is captured and a smart contract is triggered to initiate revenue sharing for their efforts.

- **sRecommender**: Recommendation systems typically require the users' data to analyse and provide more accurate recommendations. sRecommender natively protects users' privacy. It also redistributes generated revenue back to the sUsers whose data was used, allowing for more accurate recommendations and targeting for both businesses and users.

- **sAdvisory**: sAdvisory leverages sApp capabilities to help online businesses build their own advisory services. The ability to provide an advisory service to suggest suitable products to customers is a challenge for businesses. sAdvisory acts as an interface for users and an assistant bot for businesses, bringing more value to both through more precise advice and compensation for use of sUser data.

- **sAirdrop**: sAirdrop provides crypto startups with an easy way to distribute airdrops to sUsers. As sUsers are already receiving the SWASH token and are familiar with cryptocurrencies, sAirdrop provides startups with an easy access solution to airdrop their tokens to a wide community of engaged crypto enthusiasts.

4.4. sCompute

Data Scientists currently lack access to data, especially high-quality data, which can slow down and stifle innovation. If large amounts of diverse, reliable data is available, then the more accurate Artificial Intelligence models become. However, it is difficult to find and access large amounts of data due to risks associated with sharing and storing data.

With sCompute, Swash provides a way for data scientists and sClients to perform computations on the data without needing to purchase it. The data itself remains private and is not sold or moved. Instead, they can deploy their algorithms on Swash data and pay only for the computation and to access the results. The results and products built from this computation can also be resold to generate revenue for both data scientists (sClients) and the data contributors (sMembers and sUsers) whose data was included in the dataset, or statistical data on which sCompute was implemented.

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5. Technical Architecture

5.1. Design Considerations

Swash core is built on the following design principles:

- **Privacy**: We used a Privacy by Design approach to incorporate privacy into the Swash ecosystem. By making privacy the priority, we ensure that users' data is automatically protected.

- **Fairness**: Building a sustainable environment requires having a fair distribution of revenue among all members. We leverage game theory and mechanism design approaches along with fairness measures and metrics to ensure that all participants receive a fair share of revenue.

- **Transparency**: It is important for all Swash participants to know about what data Swash collects, where the data is stored, who purchases the data, and how users are compensated. All participants' activities are recorded on to the blockchain, making it possible to trace and investigate events with ease.

- **Security**: Designing a secure and reliable system requires incorporating the Defence in Depth[30] approach into the architecture of the system. We use this approach in order to take appropriate countermeasures in each layer of sCore.

- **Efficiency**: Swash uses the Ethereum blockchain and a side chain to improve user experience while ensuring the Swash ecosystem is secure and transparent.

- **Usability**: We prioritise non-crypto incentive mechanisms to appeal to a wider demographic of users. This ensures that Swash data remains diverse, making it more valuable. For data buyers, we also provide a licensing model to sell Swash products and accept payments in both fiat and cryptocurrency to allow for a seamless purchasing process.

[30] https://blog.eccouncil.org/what-is-defense-in-depth/

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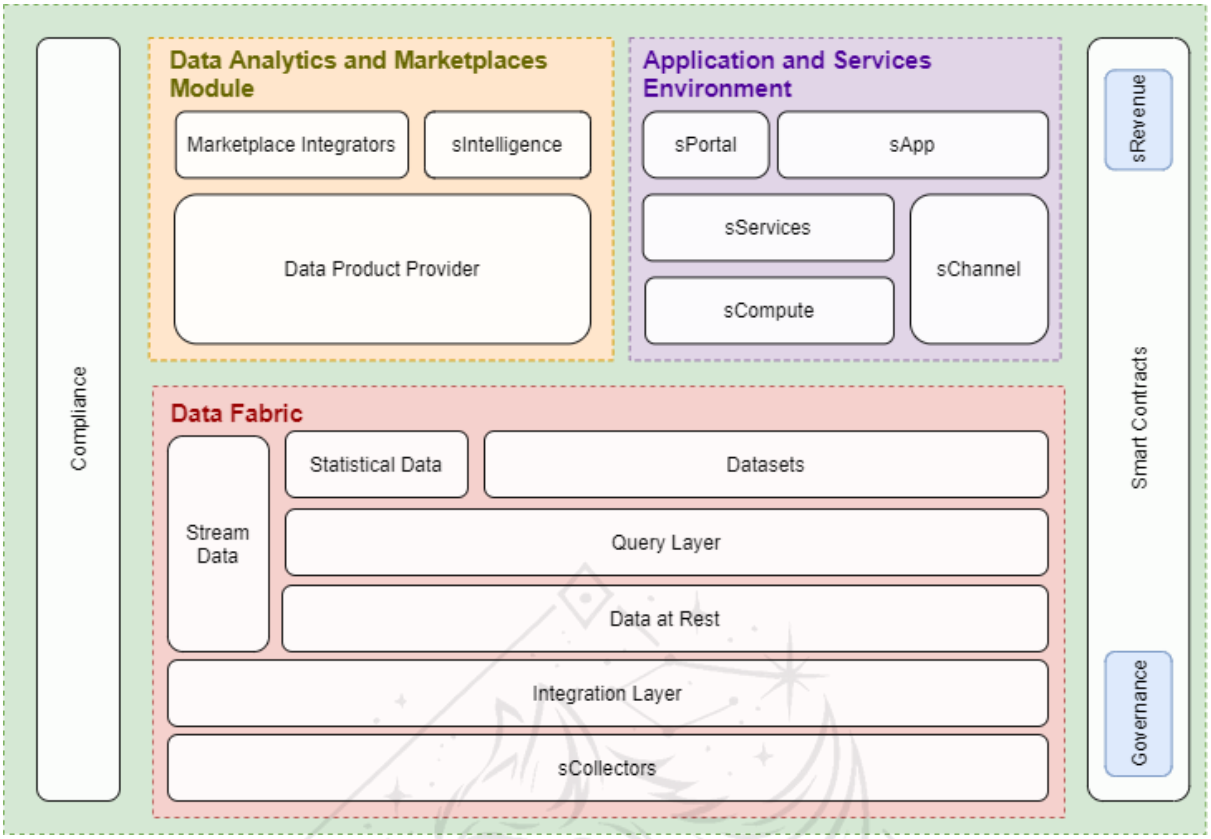


Figure 1: Swash Core Stack

The diagram above depicts the entire Swash technology stack. The Swash technical architecture consists of three main areas; Data Fabric, Analytics and Marketplace Module, and the Applications and Services Environment. Throughout all of these categories, Swash smart contracts are used to automate transactions and create a semi-decentralised ecosystem, supplemented by the compliance framework to ensure alignment with Swash data compliance standards for all actors, services, and applications.

This section is structured as follows:

- **Data Fabric**: Where all data is collected, integrated, filtered, processed, and stored
- **Analytics and Marketplace Module**: Business intelligence, analytics, and marketplace cohesion
- **Applications and Services Environment**: All the services and communication channels built around sApps
- Data Compliance
- Swash Smart Contracts, sChain, and Revenue

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5.2. Data Fabric

The first building block of the Swash environment is the Data Fabric. It is here where all data is collected, integrated, filtered, processed, and stored. sCollectors, such as the existing Swash browser plugin, browsers, or SDKs, collect data according to a set of pre-defined rules to establish what and how data should be collected while safeguarding its privacy and security.

The Data Fabric encompasses all applications, systems, networks, storages and technologies used to collect, integrate, filter, process and store data.

5.2.1. sCollector

sCollector is a general term used for all methods of data collection. Data is collected through sCollectors and then sent to the sCore. The largest and most developed sCollector at the time of writing is the Swash browser extension.

5.2.1.1. Collecting Rules

sCollectors work according to a set of defined collecting rules. A collecting rule determines what data needs to be collected and how it should be collected. It also defines the level of privacy and anonymity that should be applied to the data collected by this rule in order to protect users' security and anonymity.

A collecting rule includes:

- **Function**: A function is a method used by collecting rules to collect data. There are three types of functions: request-based, content-based and API-based functions. Request-based rules are triggered when a web request that is sent or a web response that is received match with the pattern defined by the rule. Content-based rules introduce a set of patterns that can be used by the sCollector to attach to a page and collect information from its loaded content. API-based rules use APIs exposed by web applications to collect data on behalf of users from those applications (e.g. Facebook and Youtube APIs).

- **Privacy level**: This shows the level of transformations, sanitisations and masking that needs to be applied to preserve the privacy of the data collected by the rule.

- **Anonymity level**: This indicates the level of anonymisation that should be applied on users' identity before sending the collected data to sCore.

- **Collecting pattern or object**: This includes a set of identifiers (e.g. URL patterns, DOM object selectors, DOM events) that are used by rules to determine where an object that should be collected can be found and which properties of the object should be collected.

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5.2.1.2. Swash Data

Due to the flexible internal design of sCollectors, sophisticated data collecting rules can be defined. To guarantee the usability and transparency of the system, the collecting rules are loaded dynamically from the sChain to sCollectors. This means that sMembers do not need to update the software frequently and it automatically loads the list of rules from sChain. sCollectors periodically check the sChain to get the latest defined collecting rules.

The collecting rules are used to collect data around demographics, clickstream traffic, Search, Shopping, and so on. The first layer products built will be:

- **Event Level Data Feed**: Data is the most granular at the event level and consists of structured data for sale. All file types or a selected combination could be sold to sClients. This product is used by research and analytics teams for product integration, consumer journeys, segmentation/clustering analysis, competitive research, and AI/ML development

- **Session and Duration Data Feed**: Data is still rather granular but it has been processed to calculate sessions, durations, and visits. The clients and use cases for this product are the same as for the Event Level Data Feed.

- **Projection Data Feed**: For this product, the data remains at the same level of granularity as the other two products but with projections added as a new column in the data structure. This product is easy to use for less sophisticated data science teams and is used by marketing/brand/customer insight teams.

5.2.1.3. Other Swash sCollectors

Although the Swash app browser extension is the largest and most widely used at the time of writing, sCollectors can come in various forms. A stand-alone browser or an SDK can also be an sCollector. Swash may create a stand-alone browser if there is a demand from sMembers who prefer to use a browser instead of a browser extension.

5.2.2. Integration layer

This layer is responsible for collecting and integrating a large volume of data captured by sCollectors. The Integration layer is a decentralised network that aggregates all data sent by sCollectors. This data is then lightly processed and some high level calculations such as sMember contribution status, visits, and session durations are executed. The data is then stored in the Data at Rest layer.

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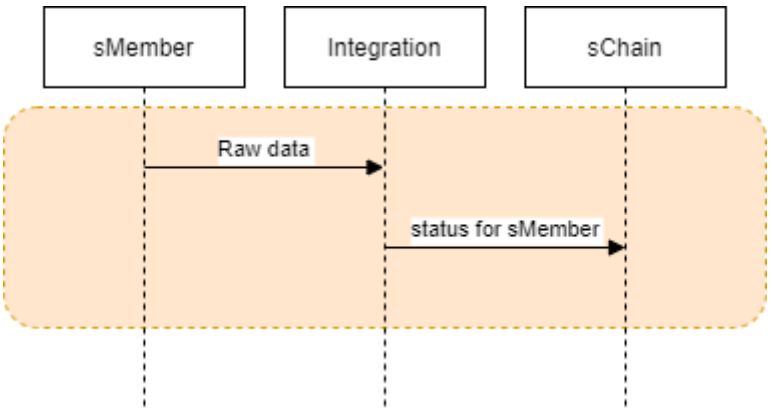


Figure 2: Integration Layer

5.2.3. Stream Data

Data can be presented to buyers in many ways, one of which is as a stream of real-time data. Stream data is the least processed version of Swash data and can be purchased through stream data marketplaces like Streamr.

5.2.4. Data at Rest layer

The Data at Rest layer is where all Swash data is stored in its raw form. It utilises Big Data infrastructure and is one of the most important components of sCore. Access to this data is controlled by Swash smart contracts which are used to automatically administer the following access requirements to ensure the privacy and security of Swash data:

- **Proprietary Information Agreement (PIA)**: This consists of an ethical and legal agreement to ensure that any buyer of Swash raw data does not use it against our existing rules and policies.

- **Data Access Rule**: This rule enforces access policies and limitations as defined in Swash smart contracts.

- **Data Compliance Rule**: Data compliance is to ensure that sMembers' data is organised and managed in a way that meets Swash business requirements and legal and governmental regulations.

5.2.5. Query layer

Swash raw data consumers, such as marketplaces, sIntelligence, and data scientists, should create their own datasets to put Swash raw data to use. The Query layer is where datasets are created using filters on the query and search tools.

Swash smart contracts enforce the access, compliance, and security policies on the requested dataset and, if everything is in order, the dataset is delivered to the consumer.

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5.2.6. Datasets

Datasets are the results of queries run over the raw data held in the Data at Rest layer. These datasets are typically created according to a specific need, such as a computation on sCompute. Datasets that are listed in marketplaces or used by the sIntelligence platform can be updated automatically using queries.

5.2.7. Statistical Data

Statistical data consists of aggregated statistical data collected over a period of time related to information like sMembers' sessions, durations, visits. This is particularly useful for sIntelligence reports.

5.3. Analytics and Marketplace Module

The Analytics and Marketplace Module is home to one of Swash's First Wave Solutions; the sIntelligence platform, plus the tools necessary for successful marketplace integrations.

Swash data is used to power the analytics provided via the sIntelligence platform and to form the data products sold on various data marketplaces. The purpose of the Data Product Provider is to define marketplace products and sIntelligence datasets while Marketplace Integrators publish, manage, and integrate marketplace tokens with the Swash token.

5.3.1. sIntelligence

sIntelligence is an analytics platform which uses aggregated Swash data to present basic and competitive metrics to companies. The sIntelligence platform also depicts global and regional trends on a daily, weekly, and monthly basis, providing unique insights on a granular level.

The aggregated data for sIntelligence is provided through two data processing methods of sCore:

- **Real-time data processing**: There is a real-time data processing capability in the Integration layer which processes raw data received by the network, generates statistical data, and stores it in a dataset.

- **Offline data processing**: An Offline Process is a scheduled job in the Query layer that is responsible for building datasets. These processes are owned and managed by sCore and the consumer of the datasets generated by these processes is the sIntelligence.

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5.3.1.1. Customised Dashboards

Subscribers to the sIntelligence platform will be presented with a frontend dashboard with KPIs and views tailored to each sector. sClients can create and manage their own dashboards and use it to generate customised reports.

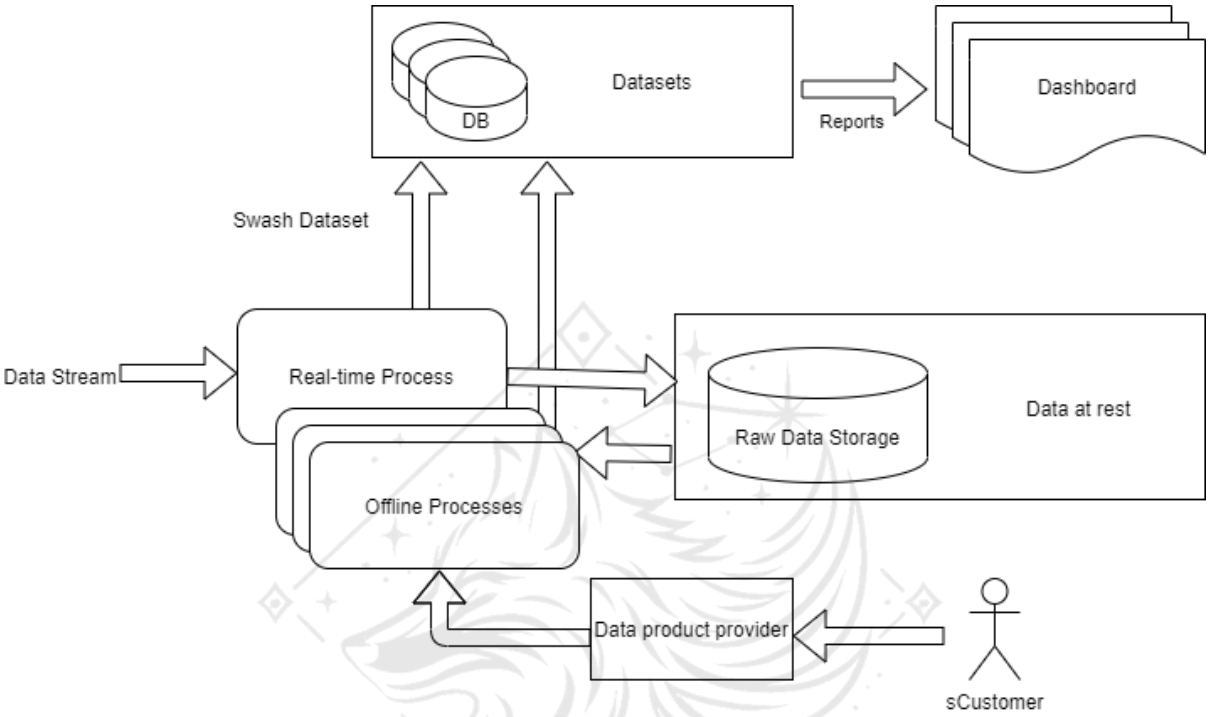


Figure 3: Customised Dashboards

5.3.1.2. Reports

The flow for requesting a report is similar to the flow for marketplaces in the data product provider. A query will be defined and scheduled by a sClient. The query will create and update a dataset. Then a report generator engine will be used to generate reports on the created dataset. The sClients can also define whether the reports are private or they should be publicly available.

These reports can be private or made publicly available according to the sClient, who should buy the sIntelligence license in order to create custom datasets to generate reports upon. The revenue acquired by selling the sIntelligence license is distributed among all beneficiaries.

5.3.2. Data Product Provider

The Data Product Provider (DPP) is responsible for defining marketplace products and sIntelligence datasets. These include a query, target marketplace, and price. The DPP can manage datasets and products through sPortal as depicted below:

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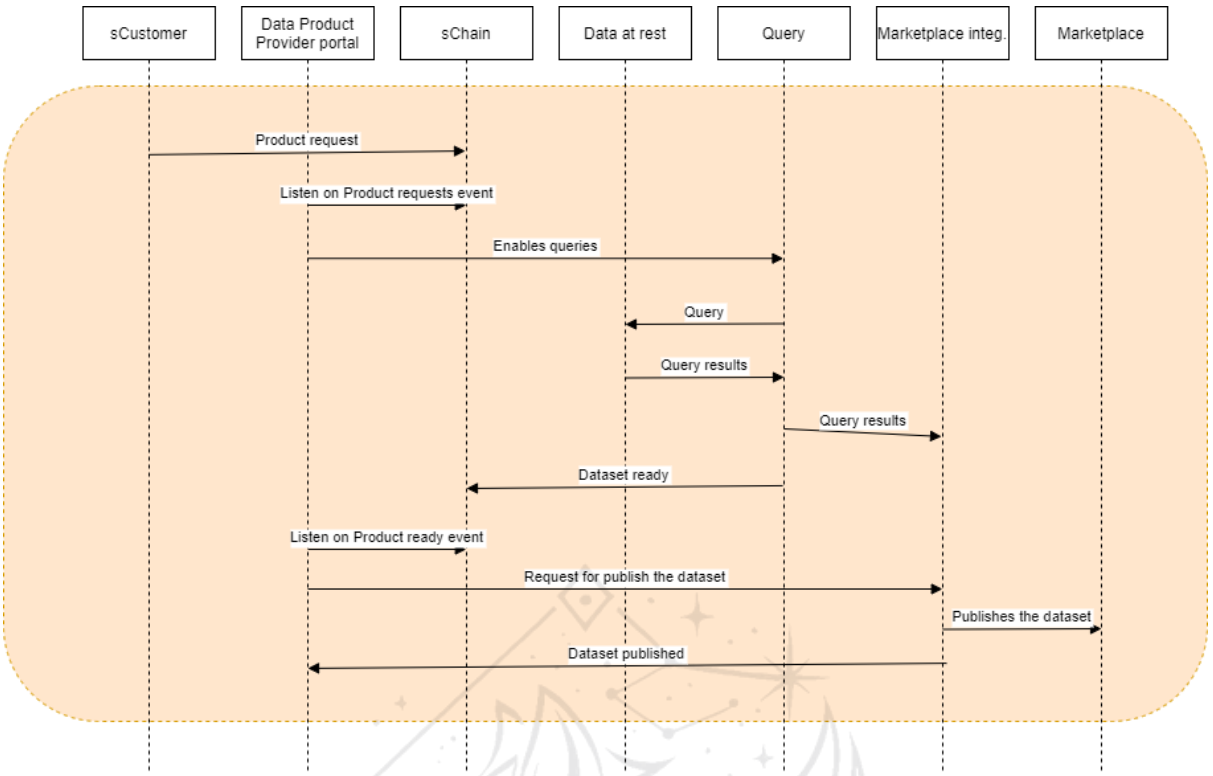


Figure 4: Data Product Provider Flow

5.3.3. Marketplace Integrators

Marketplace integrators are responsible for publishing and managing data products in the target marketplaces. They also provide a token swapping service to swap the marketplace token into the Swash token. This way the revenue of a purchase in a marketplace is swapped to Swash token and would be shared among all the beneficiaries. In the diagram below, a flow for buying a product is depicted.

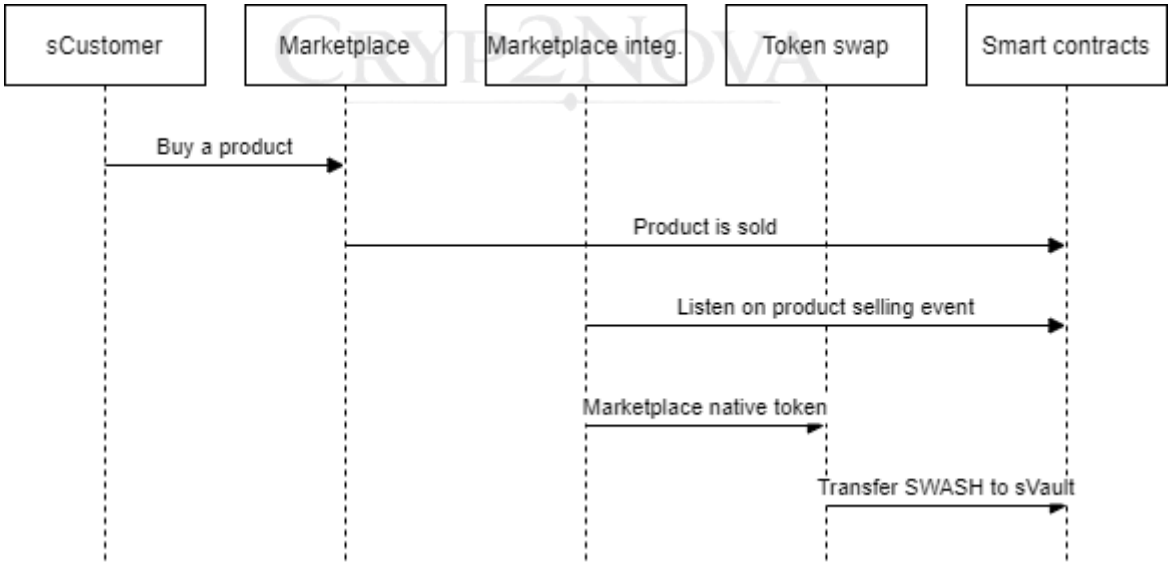


Figure 5: Marketplace Integrator Diagram

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A sCustomer buys a data product from a third-party marketplace using the marketplace's currency. The income of any purchase is deposited to the Swash marketplace integrator account. As soon as the money enters the Swash integrator account, it uses the token swap pool for converting the income to the Swash token.

Then, the swapped Swash tokens are deposited and locked out into a specific account called sVault. While the revenue sharing process takes place, the money locked out sVault will be shared periodically among the beneficiaries such as sMembers.

5.4. Applications and Services Environment

The Analytics and Marketplace Module hosts all applications and services built using Swash core technology. This includes the sApp and it's components, sCompute, sChannel, sServices, and sPortal. Through these applications, developers can better serve and communicate with their users.

The other defining element of this environment is the Data Compliance layer. sCompliance is the framework used to keep all actions relating to Swash data aligned with high standards established around data flow, management, privacy, and security through the introduction and implementation of data compliance procedures.

5.4.1. sApp

A sApp is a third-party application built on sCore. When a sMember grants sApps access to their data via an sCollector they also become a sUser. sApps can pay them for completing a task, such as watching ads or completing a poll or survey. All claims and permissions are stored in sChain to be traceable and non-repudiable.

Depending on the permissions, some of the actions an authorised sApp can do include:

- Run algorithms on raw data (sCompute)
- Send notifications to sMembers
- Create a communication channel with sMembers (sChannel)
- Load content on sMembers' browser

sApps can also interact with sUsers through a connection established by sChannel. One example of this is where an advisory system connects to the sUser to ask questions to better understand the user to be able to provide an appropriate suggestion. Examples of sApps are outlined in the First Wave Solutions section of this whitepaper. These specified use cases will be the first generation of sApps built on sCore by Swash, although we encourage external developers to create their own sApps in future.

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5.4.1.1. sApp Permissions

sApps may request access to perform different actions using sCore functionality. The following permissions may be asked by sApps:

- **In-page Content**: In-page content are predefined templates of Iframes that would be loaded by sApps as the content of a new opened tab, URL of a new blank page, or a pop-up in opened tabs.

- **User Interaction**: User Interaction refers to when a sApp needs to send something or receive data from sUsers.

- **Activity Measurement**: This permission is used to capture sUser activities related to content loaded by a sApp in order to make a measurement for campaigns operated by the sApp.

- **Computation Service**: sApps can use sCompute to run their algorithms on Swash raw data.

5.4.1.2. sApps SDK

Every sApp in the Swash ecosystem will need to collect specific data related to their application. For example, an advertising sApp needs to collect sUsers clicks and ad views. In this situation, if the sCollectors do not collect these events, the impression will be lost and the advertisement sApp can not work properly.

In some cases, sClient will need to communicate and interact with the sUsers. Swash SDK provides a way for aClients to communicate with the sUsers. This SDK provides APIs to capture customised data, fetch data through sChannels, and send data to the sApps' back-end. We make it easier to integrate businesses with sCore by providing an SDK developed in common web programming languages.

sClients can add the Swash SDK to their websites to collect specific data or to create a sChannel. Also, sApps can wrap the Swash SDK to build their own SDK in order to let a sClient collect their desired data. This SDK is available in the context of a page whenever it is injected into the web page by sCollectors.

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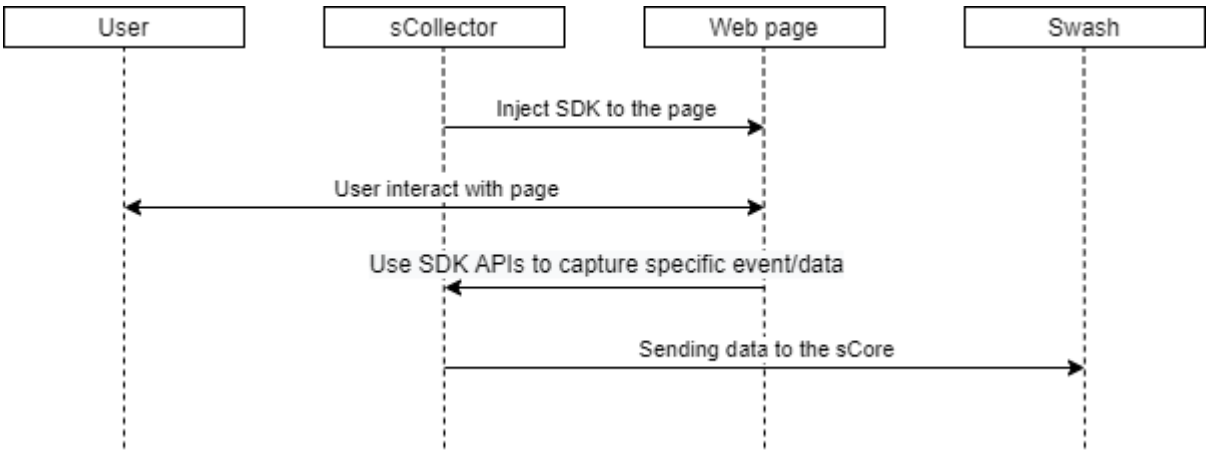


Figure 6: sApps SDK Mechanism

5.4.2. sCompute

sCompute allows sClients, such as data scientists and sApps, to perform computations on raw Swash data on-premise and in a privacy-preserving manner. They do not need to purchase the data, instead they only pay fees related to the computation itself. They can connect via the provided API or sPortal to deploy their algorithms. Computations can be fed by existing datasets or the statistical data, or even the result of the other computations. The results of the computation can then be stored as a dataset where it can be resold as a data product. The owner of the dataset and those whose data contributed to it will receive compensation when this is sold to data buyers. Computation results can also be made available only to the owner of the algorithm.

Despite the fact that created datasets have different identities for a user for different categories, in datasets created for computation, all identities of a user are mapped to a unique identity which correlates all user data points collected by different collecting rules. To preserve privacy, all algorithms should be audited manually before being used by the computation service to ensure that they are not trying to infer the identities of users and are aligned with Swash's principles and standards for security. The Swash sCompute solution uses customised secure computation infrastructure to allow for trustless and autonomous control of data.

5.4.3. sChannel

sChannel is a service that allows sApps to communicate with sMembers. This provides a means for sApps to check whether the sApp has been enabled by the user or not as well as a way for them to communicate directly with them. This connection is recorded in Swash smart contracts and will provide another revenue stream. A common example occurs in sClients' websites which benefit sApp's facilities. When a sMember visits a sClient's website, the sCollector checks whether the sApp has been enabled by the sMember. If yes, then the sMember is perceived as a sUser and the sApp is notified about the sUser's presence. The sApp then requests sChannel to establish a connection to the sUser. Once this channel has

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been established, connection details are sent to both parties. The event for the interaction between the sUser and the sApp is recorded in smart contracts for revenue sharing.

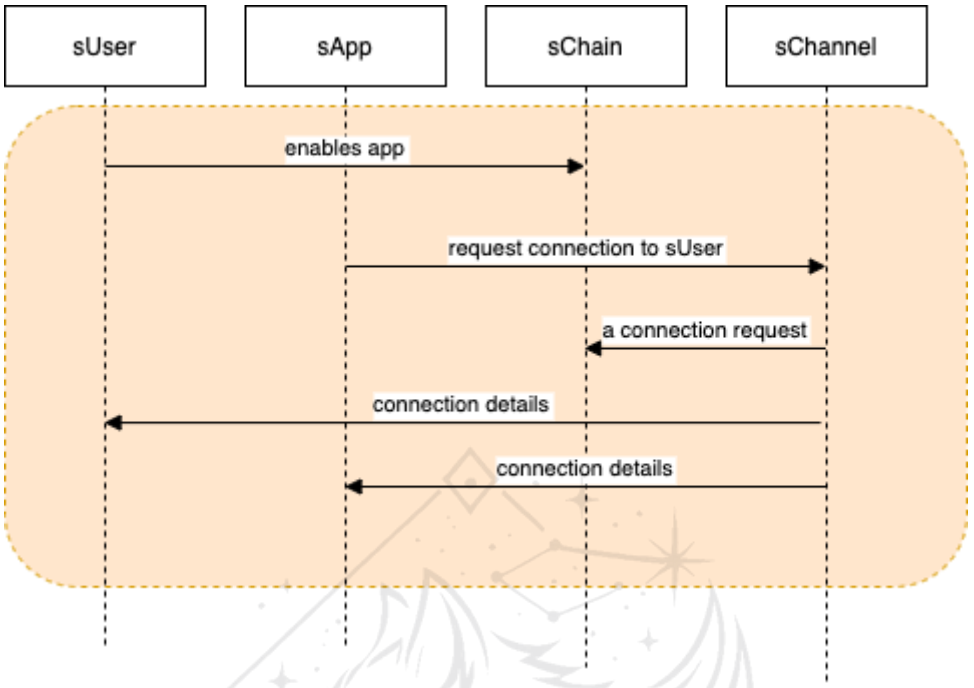


Figure 7: sChannel Flow

5.4.4. sServices

sServices are common services that can be used by sApps or other clients. These include:

- **Bot detection**: Responsible for detecting bots, this service ensures that the fairness of the system is maintained and that all sMembers are real humans and not controlled by a piece of code as a means to gather more income.

- **Captcha**: Captcha uses bot-detection findings to prepare a service like recaptcha to websites. All web businesses will be able to use Swash captcha service which will mean that sMembers will not need to solve captcha on other websites if already verified as human by Swash captcha

- **sApp measurement**: This service provides measurement data of sUsers collected by Swash SDK measurement data

5.4.5. sPortal

sPortal is the interface for sUsers, data scientists, sApp owners and sClients to work with Swash. It is a dapp that can be used for managing computation tasks, obtaining computation results, uploading algorithms, and generating reports. Visualisation of the computation process helps them to monitor their tasks and results with ease. The sPortal is organised into the following areas:

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- **Data scientist portal**: This is where data scientists can submit and schedule their algorithms. They can access the results of their computations and charge fees accordingly and, should they wish to resell the result of their computation, they can also list the result as a dataset available for sale as a product on marketplaces.

- **Data Product Provider portal**: sCustomer can submit a data product request to buy by defining a query.

- **sApp management portal**: This is where sCustomer can create and manage their sApps and view their balances and charge fees.

- **sMember portal**: sMembers can use this portal to manage their information. They can view or delete their collected raw data or view reports on their earnings. Most of this information can also be accessed via the sCollector.

5.5. Data Compliance

Whether they choose to build a sApp, run computation on data using sCompute, or use sIntelligence to make business decisions, every participant should comply with the sCompliance framework to guarantee the safety and security of Swash data and alignment with the overarching Swash mission.

sCompliance sets the standards and practices for data flow, management, privacy, and security. To make compliance with regional, governmental, state, and country level laws more manageable, sCompliance introduces the following steps:

- **Data Source Identification**: The first step towards compliance is to determine which data sources can be identified as ‘Data at Rest’ or ‘Data in Motion’. Geolocation of the data sources should also be captured and maintained to ensure compliance with varying laws and regulations in different regions, countries and states.

- **Data Map Creation**: The next step is to identify whether any data is collected by sCollectors, how it is collected, stored in the Data at Rest layer, who the buyers of the data are, and how the data will be sold.

- **Data Governance**: Once the data source inventory and the data map have been created, the privacy rules from different regulations will be documented. Then, a governance model will be designed, processes and procedures will be documented, and the link between Swash business terms and data sources will be established through Swash governance contracts. sCompliance uses blockchain technology to transparently record all compliance activities.

- **Privacy Disclosure**: In response to privacy laws, we provide a publicly available privacy disclosure before the point of data collection. This includes terms like the items and categories of data sCollectors collect where the data is gathered from, and the types of companies who buy data.

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- **Data Protection**: We implement cryptographic techniques like encryption, pseudonymisation, and anonymisation along with security procedures and processes, such as vulnerability and incident management, in all the sCore layers to practice the policies and procedures defined by the governance model.

- **User Request Handling**: We develop a step-by-step process to handle sMembers inquiries such as providing a copy or deleting their data within a timeframe accepted by privacy laws.

- **Audit**: The last step of sCompliance involves auditing. At this stage, we produce reports to show regulators that we have a solid understanding of what sCollectors collect, where sMembers' data is stored, how the data is processed, and who buys the data. These reports also show that a governance framework has been implemented to protect sMembers' data and to respond to any breaches and incidents.

6. Swash Smart Contracts

Swash uses smart contracts in order to design a trustless and transparent ecosystem. The smart contracts will be deployed on Ethereum mainnet and are used to provide data governance, access control, token swapping and revenue sharing.

Along with the Ethereum mainnet, a side chain like xDai, BSC, or Polygon, will be implemented in order to reduce transaction fees and speed up the transactions. The wallet address of all actors in the Swash network will be considered as their identity.

6.1. sChain

sChain is the side chain used by the sCore. It includes faster and cheaper smart contracts that are responsible for recording all important information required to preserve transparency and create a fairer revenue sharing system.

Events like participating in a campaign, selling a product, or sMembers measurement data are recorded in the sChain. The logs in the sChain are publicly available and everyone can use it to investigate how the data is accessed by parties and how the revenue is shared by Swash. As an example, if sClients who run a campaign need to verify who has completed their tasks and when they completed them, they can easily refer to sChain and see the logs related to their campaign.

6.2. Access Control

Access Control is a fundamental component of Swash core that dictates who is allowed to access and use Swash datasets and services. This includes access to a dataset on a marketplace, access to sIntelligence reports, and access to the result of running an algorithm on a dataset.

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sCustomers and sClients are directly authorised on-chain for any access to datasets and services. Swash smart contracts are used as the Policy Information Point (PIP) and Policy Enforcement Point (PEP) of the Swash access control mechanism. They need to fulfill the necessary conditions determined by Swash smart contracts in order to access a specific resource.

6.3. Revenue Structure

6.3.1. Income Streams

Swash uses the events recorded in sChain to implement a fair and transparent revenue distribution model. The following section outlines the various revenue streams found within the Swash ecosystem. These consist of income generated from the sale of datasets or the provision of services.

- **Direct sale income**: This type of revenue refers to when a sCustomer or sClient pays directly for a product or service. This includes selling a dataset on a marketplace owned by Swash.

- **Indirect sale income**: An indirect sale income is when Swash products or services are resold on third-party data marketplaces. These datasets will be sold on third-party marketplaces using their native tokens or currencies and then swapped to the Swash data token in swap pools.

- **Subscription-based income**: sCustomers can subscribe to a product or service on a monthly or annual basis, such as through marketplace streams or sIntelligence subscriptions.

- **License-based income**: This refers to when sCustomers or sClients use the products, services, or intellectual property of Swash under the terms and conditions of an agreement. It includes purchasing a dataset with the permission to resell, for example.

- **Campaign-based income**: This is revenue generated by running a campaign through a sApp, which remunerates sUsers for completing a task. This could include participating in a poll or survey.

6.3.1. Revenue Sharing

The Swash revenue sharing mechanism is completely decentralised and works based on sChain and mainnet records. A revenue sharing system should not only be fair and transparent, but it should also provide a way to help increase the Swash adoption rate and reduce churn.

Swash shares revenue by using a smart contract named sVault. All income is received and locked into this smart contract. Then, revenue is shared at regular intervals in which a portion of it is shared among all beneficiaries.

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All of the products and services of Swash which are delivered to sCustomers and sClients are created on top of the datasets. Each dataset includes the user's contribution information. Then, sRevenue uses the contribution information to share the revenue. The amount of income that remains after accounting for all expenses and commissions is distributed among the beneficiaries as follows:

- **Operating earnings**: This is the amount earned by beneficiaries as a result of selling a product or service that they contributed to. An example of this would be when sMembers receive a proportional earning according to their contribution to a dataset sold on a marketplace.

- **Non-operating earnings**: This refers to earnings that are not derived from sMembers operating activities. Examples of this include paying a new sMember who has not completed a task yet and referral earnings received after recommending Swash to a friend.

Note that in each sharing interval, only the portion of earned income related to that period is divided. As an example, a licensing fee for the duration of six months is deposited into sVault, but only a portion of the entire amount is divided among beneficiaries in the first period.

The income for the following periods is then escrowed in sVault ready to be shared:

1. Available balance to share is calculated in sVault
2. All expenses such as computation fees and network fees are subtracted
3. Net income is calculated
4. Operating earnings are calculated by accounting for the Swash ecosystem sustainability fee rate and non-operating earning rate. The Swash ecosystem sustainability fee ensures the ongoing development and maintenance of the Swash ecosystem.

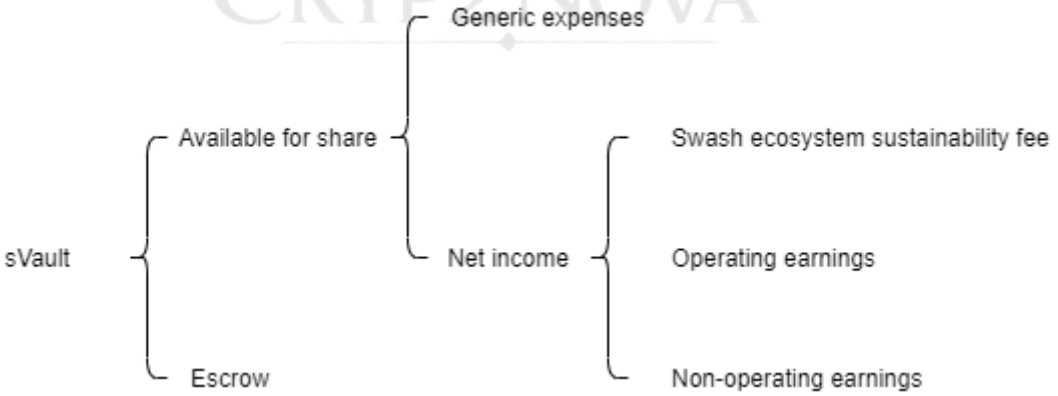


Figure 8: sRevenue Distribution Mechanism

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All deposits to sVault are recorded on the blockchain. For each income, a record named ‘Operating Earning’ that shows the beneficiaries of the income is also logged. The Operating Earning record is a tuple as the following:

$$\alpha = \langle income, \{b_1, b_2, \dots\}, \{\langle b_1 \to s_1 \rangle, \langle b_2 \to s_2 \rangle, \dots\} \rangle$$

In this tuple, the first element is the income, the second element is the set of all beneficiaries and the third element is a function which returns the beneficiary's portion of the income. All portions are normalised to a positive number between 0 and 1:

$$0 \leq s_n \leq 1; \sum_{n=1}^{N} s_n = 1$$

N is the number of all beneficiaries in this record.

We define the function “contribution” which calculate the contribution of a beneficiary for a **operating earning** record as below:

$$contribution(b, \alpha) = \begin{cases} income \times \alpha^{(3)}(b) & b \in \alpha^{(2)} \\ 0 & otherwise \end{cases}$$

In this equation, $\alpha^{(n)}$ refers to the n-th element of the tuple α.

A **non-operating earning** record also can be presented in a tuple as the following:

$$\beta = \langle w, \{b_1, b_2, \dots\}, \{\langle b_1 \to c_1 \rangle, \langle b_2 \to c_2 \rangle, \dots\} \rangle$$

In this tuple, the first element is the weight of a non-operating activity, the second element is the set of all beneficiaries (sMembers) participating in this activity and the third element is a function which returns the beneficiary's contribution degree in this activity. All contributions are calculated as a number between 0 and 1:

$$0 \leq c_n \leq 1; \sum_{n=1}^{N} c_n = 1$$

The weight of an activity shows the importance of the activity. If $w_i > w_j$ a contribution in activity *i* brings more income than contribution in activity *j*.

Note that $\sum_{n=1}^{N} w_j = 1$ where *N* is the number of all activities defined in the current sharing interval.

We define the function “activeness” which calculate a party’s activeness in an activity as below:

$$activeness(b, \beta) = \begin{cases} w \times \beta^{(3)}(b) & u \in \beta^{(2)} \\ 0 & otherwise \end{cases}$$

When the revenue sharing process is triggered, it reads the following inputs:

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$$A = \{\alpha_1, \alpha_2, \dots\}$$
$$B = \{\beta_1, \beta_2, \dots\}$$
$$F = \{f_1, f_2, \dots\}$$
$$S, E$$

The first input is the set of all records indicating Swash operating earnings in the current interval, the second is the set of all records indicating Non-operating earnings, the third one is the set of all fees, $S$and Edenote the Swash ecosystem sustainability and non-operating earning rates ($0 < S + E < 1$).

Note that sVaults' income available for sharing is equal to $\sum_{n=1}^{|A|} \alpha_n^{(1)}$. $|A|$denotes the cardinality of a set (the number of elements in the set).

The net (*NET*) income, Swash ecosystem sustainability fee, and the sharable income among beneficiaries in operating earnings (*OE*) and non-operating earnings (*NOE*) methods are calculated as:

$$NET = \sum_{n=1}^{|A|} \alpha_n^{(1)} - \sum_{n=1}^{|F|} f_n$$
$$Fee_{swash} = S \times NET$$
$$NOE = E \times (1 - S) \times NET$$
$$OE = NET - NOE - Fee_{swash}$$

We define a scale ratio $SCALE_{OE}$as follows:

$$SCALE_{OE} = \frac{OE}{\sum_{n=1}^{|A|} \alpha_n^{(1)}}$$

Operating earning of a user is calculated as:

$$income_{OE}(b) = SCALE_{OE} \times \sum_{n=1}^{|A|} contribution\left(b, A^{(n)}\right)$$

Non-operating earning for a user is calculated as:

$$income_{NOE}(b) = NOE \times \sum_{n=1}^{|B|} activeness\left(b, \beta^{(n)}\right)$$

And finally, the user income is:

$$income(b) = income_{OE}(b) + income_{NOE}(b)$$

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7. Swash Token

7.1. Swash Token Utility

Swash tokens are the native tokens for the Swash ecosystem. We denote Swash tokens by the ticker symbol, SWASH. These tokens have multiple uses within the Swash ecosystem as a cross-chain utility and a governance token and are a unit of exchange for buying or selling Swash data or services.

As demand for SWASH will increase alongside ecosystem adoption, generated value may be used to balance the token supply, likely through periodical token 'burning'.

Incentives: As an incentive system, sMembers and sUsers shall be rewarded with Swash tokens in return for their participation in the ecosystem.

Marketplaces: Buying and selling data products on marketplaces will either take place with Swash tokens or in the marketplace's currency.

sIntelligence: When sCustomers subscribe to access the sIntelligence platform, they will pay for this service in Swash tokens.

sChannel: Swash tokens will be used to pay to access communication channels with sUsers.

sCompute: Swash tokens will be used whenever data scientists or sApps pay to access or run algorithms on Swash data.

Multiply: sMembers can individually and collectively donate the value of their data in social development causes and use it for value exchange both within and outside the Swash ecosystem, such as redeeming earnings for products or staking liquidity.

Governance: Swash token holders can vote for projects they wish to see receive funding from the Swash DAO fund, vote on new roadmap developments or modifications, and to vote on token-related decisions.

7.2. SWASH Token Metrics

Token Name	Swash
Ticker Symbol	SWASH
Token Type	Cross-chain ERC677 and BEP20 Token
Total Supply	1,000,000,000

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Initial Circulating Supply	5.4% of Total Supply
Initial Public Sale Price	USD 0.09
Pre-seed Round	9%
Seed Round	3%
Strategic Round	5%
Pre-Sale Round	5%
Public Sale	5%
Ecosystem and DAO Growth	14%
Community and Platform Rewards	14%
Foundation	15%
Founders	15%
Liquidity Provision	5%
Team & Advisors	10%

8. Trusted Governance - Swash DAO

As Swash expands, we are working on developing a seamless transition from a more centralised structure to one that is decentralised by leveraging blockchain technology. Centralised organisation structures are perceived as slower to integrate new solutions[31], such as the ability to distribute revenue according to users' contributions. In contrast, some argue that fully decentralised governance that flattens power and democratises decision-making can be very slow, which hinders innovation and expansion.

A semi-decentralised structure allows for the Swash ecosystem to achieve the optimum governance, allowing for the incentivisation of stakeholders while accelerating decision making processes. Decisions like the Swash ecosystem sustainability fee rate, non-operating earnings, and the development can be decentralised based on Swash smart contracts while others, such as improving the technical infrastructure, can be made by the development team.

The Swash community and SWASH token holders will be able to participate in the following:

- Voting on new roadmap developments or modifications
- Voting on token-related decisions
- Voting on projects to receive support from the Swash DAO fund

[31] https://www.capgemini.com/what-works-best-a-centralized-hierarchical-organization-or-one-where-authority-is-delegated/

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9. Roadmap

The team behind Swash are continuously improving software and services at all levels of the ecosystem; smart contracts, marketplaces, applications, community, and services. The Swash development milestones are primarily centred on implementing fair revenue distribution, functionality growth and moving from centralised to a semi-decentralised infrastructure to achieve a transparent and fault-tolerant value chain.

Rise: Q3 2020 - Q1 2021

- Developed and expanded the foundational building blocks of Swash architecture
- Made the Swash browser extension available on all major browsers and achieved a rapidly-growing user base
- Data that is captured through the extension is available for sale on marketplaces, such as Ocean Protocol and Streamr
- A basic dashboard was developed to present a statistical summary about the collected data, forming the basis for the sIntelligence platform

Surf: Q3 2021 - Q4 2021

- Connect directly with data buyers through marketplace integrations
- Integrate direct investment in social goods organisations into the Swash extension
- Continue integrating the Swash extension with all web browsers and getting Swash published on web stores - including Safari and mobile web browsers
- Develop the Data at Rest and Integrator layers to manage collected data before building the Query and Search capabilities
- Enhance the sIntelligence platform to present predefined reports and to add sessions and durations
- Launch the first version of Swash smart contracts to enable equal revenue distribution between sMembers

Flow: Q4 2021 - Q3 2022

- Reveal sCore services and functionality while enhancing transparency and revenue sharing capabilities
- Release the first versions of sCompute and sChannel
- Migrate Swash smart contracts over to the next generation to cater to new ecosystem demands
- Develop sPortal to grant necessary control on sCompute to data scientists and sApps
- Release the next version of sIntelligence to present product category dictionaries in line with user and functionality growth

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- Develop sApp infrastructure and the first version of SDK to launch the preliminary version of sApps
- Improve revenue distribution mechanisms to reach proportional sharing according to sMembers' and sUsers' contributions

Surge: Q2 2022 - Q4 2022

- Develop and launch sServices bot detector and the first version of Captcha
- Release the first sApps - sPoll and sRecommender
- Present sServices through sPortal to data scientists to assist them in running algorithms and selling their datasets and models on marketplaces

Onshore: Q1 2023 - Q3 2023

- Implement upgrades to sPoll and sRecommender
- Deliver other sApps - sAd, sAdvisory, and sAirdrop
- Continued improvements on bot and fraud detection mechanisms

Swash: Q4 2023 - Q2 2024

- Release second version of sAd, sAdvisory, and sAirdrop
- Establish transparency and fair revenue distribution with the final version of Swash smart contracts
- Upgrade sCompute and Data at Rest from centralised infrastructure to decentralised infrastructure, in relation to broader technological developments

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10. Team, Advisors, and Partners

We're proud to have a skilled and diverse team with extensive experience in software development, cybersecurity, and blockchain. Our team members are all senior in their field, have strong academic backgrounds, and have worked across a variety of industries and roles, including banking, enterprise, research, application security, media and advertising, to name a few. We are focused on boosting awareness of Swash through business development and marketing efforts, helping to shape the understanding of not only Swash but the larger data economy and the pressing need for change at scale.

We take an action-oriented approach which has allowed us to remain a step ahead of the rest while cultivating a healthy appetite for the latest advancements in the world of decentralised data, blockchain, and emerging economies. As a globally distributed team located in Finland, Belgium, Canada, and the UK, our unique, cross-cultural and

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multidisciplinary experience is united by the common values that underpin Swash's mission and drive a culture of innovation, curiosity, and experimentation within the team and our larger network.

These values and the core mission behind Swash are also prevalent amidst our partners and advisors, who were carefully selected to guarantee successful long-term collaboration and clear means of support and guidance. Swash advisors are composed of industry experts spanning data analytics, policy, advertising and media, and Web 3. Our advisors guide us on various aspects of the business, including business applications, market positioning, and product development.

Swash partners include Streamr[32], Ocean Protocol[33], Chainlink[34], 1World Online[35], Amasa[36], WEDF[37], Boson Protocol[38], among others. As part of our vision, we will work closely with our partners to integrate their solutions, build bridges between systems, and set new standards to support broader ecosystem development and, ultimately, mass adoption.

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[32] https://streamr.network/case-studies/swash/
[33] https://blog.oceanprotocol.com/announcing-ocean-market-data-launch-partners-3b531601e63a
[34] https://swashapp.io/blog/swash-integrating-with-chainlink/
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[36] https://amasa.medium.com/amasa-is-excited-to-partner-with-swash-a-micro-income-stream-provider
[37] https://swashapp.io/blog/wedf-2021/
[38] https://medium.com/bosonprotocol/crypto-rewards-dapp-niftykey-boson-protocol-announces-partnership-with-swash

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