

The future of data exchanges.



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# Acentrik's Overview

# 1a. Introduction

Digital transformation is evident in the world today with technology innovation speeding exponentially. Today's technology applications are glimmers of the emerging world of Web3.0, where it is *the evolution* of computing and information technology. Industries and enterprises are measuring efficiency gains through the use of data, driving business strategies and products. From Artificial Intelligence (AI) to 30+ billion connected devices of IoT, real-world data is connected every second, everywhere'.

We do know the importance of data connected – but there is much opportunity to finesse the way which data is managed and unlocked in enterprises. Even though enterprises look to begin utilizing their data, they are not looking outwardly so. Privacy and security have become a critical consideration, which made people turn to considering distributed ledger technologies, such as Blockchain<sup>2</sup>. Through built-in immutability, integrity of data transactions are ensured, allowing data to be managed through access and identity control<sup>3</sup>.

Putting all these into an equation sparked the opportunity for decentralized data marketplaces, being the platform for exchanges of data assets within and amongst organizations.

This is how Acentrik is being built on – the foundation of state-of-the-art technology and privacypreserving features, which can be suited for multiple applications based on organizations' objectives.

## 1b. About Acentrik

A strategic product of Mercedes-Benz, Acentrik is built to solve common global data challenges effectively, and in an agnostic way for companies to easily deploy our solution, leveraging on our first-in-market technology.

In the current data-driven business world, the emphasis is rapidly shifting from just technological advancements to how these technologies are harnessed, developed, and scaled. The evolving corporate landscape is increasingly seeing various organizations not as competitors but as collaborative partners, pioneering innovations together and scaling them at unprecedented speeds.

As a whitelabel technology solution provider, Acentrik plays a crucial role in this evolving landscape. It empowers organizations and government institutions to establish their own data platform solution, fostering a data ecosystem where trust is paramount, especially when it involves multiple stakeholders connecting on a single platform. With its enterprise-centric features and processes, Acentrik is a turnkey solution for both enterprises and government institutions to kickstart their data journey.

<sup>&</sup>lt;sup>1</sup> Peter H. Diamandis, "The Spatial Web will map our 3D world—and change everything in the process," Singularity Hub, November 16, 2018 (<u>https://singularityhub.com/2018/11/16/the-spatial-web-will-map-our-3d-world-and-change-everything-about-it-in-the-process/</u>)

<sup>&</sup>lt;sup>2</sup> Avivah Litan, "Blockchain's Big Bang: Web 3.0," Gartner, August 8, 2019. (<u>https://blogs.gartner.com/avivah-litan/2019/08/08/blockchains-big-bang-web-3-0/</u>)

<sup>&</sup>lt;sup>3</sup> Bala Venkatesh, "What is Blockchain technology and future world of web 3.0," Medium, June 25, 2018. (https://medium.com/coinmonks/what-is-blockchain-technology-and-future-world-of-web-3-0-6ba5cdcd5f87)

#### **1c. Platform Features**

Acentrik enables data exchanges across industries, providing the right tools to organizations to achieve the objectives of data transformation whilst upholding data sovereignty. In this section, features and explanations of the marketplace will be detailed.

1. Data Types

The types of data that exists on a marketplace deployed by Acentrik are Datasets and Algorithms. A Dataset can be either downloaded or computed, depending on the access type set by the Data Provider.

For Algorithms, they can be either Public or Private. Being Public means the Algorithm is downloadable, while for Private Algorithm, it can only be paired with compatible Datasets for compute purposes only.

Both Dataset and Algorithm have two data listing types – either Experimental or Production. For the former, it is suitable for testing purposes.

2. Tokens on Acentrik



- An ERC721 Token, which is known as Acentrik Asset Management Token is used to represent ownership and management of a particular Asset on the marketplace. Upon publishing of the Data Asset, this token is stored in the Data Provider's connected Wallet. Management of this particular Asset is possible through finegrained permissions which will be illustrated below in section 2e.
- An ERC20 Token known as a Datatoken on Acentrik, is used to represent each data exchange between a Data Provider and Data Consumer. For each published Data Asset, a custom ERC20 datatoken is created. I.e.: When a Data Provider sells his/her data asset and creates a fixed price, it mints a custom datatoken based on ERC20 standards as a method of payment. When the Data Consumer purchases the custom datatoken in any exchange platform with their stablecoins, he/she can gain access to the data. Once these datatokens are used, these tokens are burnt and are no longer in the Data Consumers' wallets.
- 3. Agnostic nature

Acentrik is agnostic by nature, allowing great flexibility to deploy to organizations. In addition, this ensures we remove reliance on any third-parties. It is essential to be infraagnostic, with the ability to connect to any platforms.

4. SDK

On Acentrik, users can use Python Library to publish or consume data privately and securely. Data Providers can publish data services, downloadable files or compute datasets with compatible algorithms; Data Consumers can mint and consume datatokens to access the services. For more information, you can see our SDK guides here <https://github.com/mercedes-benz/acentrik/tree/main/sdk>.

# Personas and Actions

## 2a. Data Provider and Publish

Organizations can monetize their data on the data marketplace by taking on the role of a Data Provider. The publishing process is easy and intuitive – from connecting their data source to setting a price for their Data Asset, the journey for data monetization is fuss-free and easy for enterprises. Details of the Asset includes access type, endpoint of the datasource, parameters, description, sample data, etc. Upon publishing, the metadata is stored encrypted and on-chain in Acentrik, while the actual data remains in the environment of the data provider.

Details of the Asset includes:

- Parameters
  - Parameters: Data Providers can input various types of parameters, including mathematical expressions, decimal values, and negative numbers. These parameters allow assets to prompt users for inputs, which can be integers, strings, or lists, during publishing. They define which parts of the asset can be fetched from the endpoint.
- HTTP headers
  - Data Providers can also have the option of adding HTTP headers to their endpoint link to transmit authentication information and manage client preferences, content types, and other crucial metadata.
- Communication channel from Data Consumers
  - Data Providers can receive inquiries from potential Data Consumers via a form without revealing their business email addresses. If Data Providers wish to continue the conversation, they can do so at their discretion by using the consumers' email addresses provided in the form.
- Asset description: Text editor Markdown What-You-See-Is-What-You-Get (WYSIWYG)
  - Data Providers can streamline data asset publishing and listing with an intuitive WYSIWYG text editor, allowing easy updates and formatting of data asset descriptions without manual markdown. The Markdown editor is also compatible with Daring Fireball.

One of Acentrik's priority is to ensure control of data stays with the Data Provider/Owner – data sovereignty is maintained by allowing only data owners to perform below actions:

- Acentrik implements fine-grained permissions for data assets, offering 3 layers of control:
  - 1st layer: Authentication level
    - Users are validated by both Web2 and Web3 credentials.
  - 2nd layer: Role-based access level.
    - With three different roles: View-Only; Data Provider, Data Consumer or Both.
  - 3rd layer: Asset-level permissions
    - Data Providers can allow/deny access to their assets based on Web3 Authentication, email domains and addresses, wallet addresses, or country, enabling control of accessibility at an asset level.
- Ability to transfer ownership and management rights to another wallet
- Acknowledgement of compatible algorithms to ensure security for datasets
- Ability to use a public custom docker image as an alternative runtime environment.
- Ability to connect enterprise's private edge node to data source
- Sales History Dashboard view and manage total number of sales transactions of respective data assets
- Ability to deactivate the sale status of a Data Asset, hence exercising control on access to their Data Asset
- Ability to delist the Data Asset from the marketplace

In Acentrik, there are two distinct types of Data Provider/Owner: the Dataset Owner and the Algorithm Owner. While Acentrik's core feature of Compute-to-Data involves collaboration between these two distinct entities – the Dataset Owner, who has control and ownership over the data, and the Algorithm Owner, who seeks to perform computations on this data – it's important to note that these roles are not mutually exclusive. In some cases, the owner of the dataset may also be the owner of the algorithm, indicating a single party's control over both assets.

Aspect	Dataset Owner	Algorithm Owner
Role	Custodians of data, controlling access and maintaining datasets.	Developers and potential consumers of data, creating and utilizing algorithms for targeted data analysis.
Purpose / Objective	Break data in silos or for data monetization.	Train models, perform data analysis, and derive insights.
Access	<ul> <li>Approve new algorithms for datasets. Manage data access controls.</li> <li>Connect enterprise's private edge node to data source.</li> </ul>	<ul> <li>Access datasets based on permissions set by Data Providers.</li> <li>Connect enterprise's private edge node to algorithm.</li> </ul>
Security	Data kept at source, ensures data privacy for compute datasets. Ability to select and approve compatible algorithms.	Algorithms kept at source, enabling compatibility of algorithms with secure runtime environments.

Ownership and management of the published Asset is represented by the <u>ERC721 Token mentioned</u> in section 1c, which is referred to as the Acentrik Management Token.

## 2b. Data Consumer and Consume/Compute

A Data Consumer can browse through the data assets on the data marketplace, through the "Explore" tab to search for that suitable Dataset or Algorithm that adds value to business goals. In order to consume any data assets, the Web3 Wallet of the Data Consumer has to be connected successfully to the platform. A Data Consumer can either download or compute Data Assets given the accessibility duration stated by the Data Provider.

On the Asset Details page, aside from the overview and additional information, such as sample screenshot of the asset, Data Providers can receive inquiries from potential Data Consumers via a form. This process ensures Data Providers do not divulge their business email address, and they have the option to continue the conversation with consumers' email addresses provided in the form at their discretion.

A Developer Details section is also available. This allows for a Data Consumer to integrate Acentrik to internal enterprise applications and provide the availability for consumption of data asset via SDKs.

Compute jobs are for Data Consumers who would like to derive analysis through data transformations in a privacy-preserving manner. This is possible with a Compute Dataset paired with a compatible Algorithm on the marketplace. The output file is downloadable containing data analysis from the compute job.

#### 2c. Compute-to-Data

One of the key features of Acentrik is Compute-to-Data, which is bringing compute to data instead of bringing data to compute. It enables algorithms to be executed on datasets without the data ever being exposed or transferred. Dataset owners retain control by specifying which algorithms can operate on their datasets. For data consumers / algorithm owners, this means they can run remote compute jobs on data that was previously inaccessible due to privacy concerns. This capability is particularly beneficial for tasks like data analysis, Al training, or predictive modeling, where access to diverse, real-world data sets is critical but must be balanced against privacy and security concerns.



#### 2d. Roles and access on Acentrik

We understand the importance of enterprises and users requiring more precise ways to manage access to their assets. There could be multiple users belonging to the same enterprises, but yet holding different roles and positions within their enterprise. Access is based a role, specified as a credential. This is determined by a combination of user profile and wallet address. With which, there are several roles on Acentrik to be granted to the user.

- User role (view-only): Once a user has their domain verified and account validated with Acentrik, he/she will be granted with a user role by default. This allows the user to explore Data Assets on the marketplace with greater details. However this role does not allow the user to perform any marketplace actions until requested and granted by Acentrik's Customer Success Team.
- Provider role: A user with this role can connect their Data Asset to their endpoint and list it on the marketplace. They can also collect revenue from purchases on their Data Asset on their connected Wallet.
- Consumer role: A user with this role can purchase available Data Assets on the marketplace. The user can purchase Premium Priced Assets with a specific amount of USDC, deducted from their connect Wallet or access to free-of-charge Assets on the marketplace.

A user can be granted either roles or both roles, depending on the preference stated by the enterprise administrator.

#### 2e. Fine-grained Permissions of Acentrik

Controlling access of data assets on Acentrik is addressed more precisely at an Asset-level. This method allows for a targeted balance between accessibility and security, providing a nuanced environment for data sharing.

Asset-Level Permissions: Acentrik allows control at an individual asset level.

- Data Providers have the ability to establish allow and deny lists to a published asset, allowing Data Providers to control access to their individual Assets based on multiple parameters including:
  - Web3 Authentication
  - Email domains and addresses
  - Wallet addresses
  - Geographic location

When there are entries on both allow and deny lists, the Asset is not accessible to those on the deny list, and only made accessible to those on the allow list.

While publishing an Asset, a Data Provider has the ability to allow all or restrict all users from purchasing the data asset. This is to prevent any user who does not fit into a provider's criteria from consuming the asset immediately after being listed on the marketplace.

#### 2f. Pricing and Fees

Data has different characteristics compared to tangible products that prevent the direct transfer of established processes and rules of trading goods, especially in terms of pricing mechanisms<sup>1</sup>.

#### Free pricing

Data Providers may wish to give Data Consumers access to their Datasets and Algorithms free-ofcharge. This option is useful in cases when Data Providers deem a Data Asset suitable for experimental datasets.

#### Premium pricing

On the other hand, Data Providers may want to sell data for a premium price (fixed amount of stablecoins). This is achieved through a simple smart contract that includes transfer of stablecoins one way, and transfer of datatokens the other way. Refer to section 1c on Tokens of Acentrik.

# Acentrik's Vision and Whitelabel Applications

#### 3a. Vision

Acentrik's vision is to enable organizations worldwide to fully unlock and leverage data for new value streams and opportunities. With one horizontal technology, Acentrik is not mutually exclusive to any industry or geographical location. It is built for organizations with focus to create value out of data, ensuring privacy and sovereignty. There are multiple applications to deploying a whitelabel data exchange platform for an organization as per the following subsections.

#### 3b. Internal Application of Whitelabel

A multinational corporation with various subsidiaries can use a whitelabel solution for internal data sharing and exchanges across geographical locations for execution of the enterprise's data strategies.

Possible participants: Departments within organizations, Subsidiaries and regional offices, Crossfunctional teams.

#### **Objectives:**

- 1. Data informed product innovation: Leverage shared insights from various departments to foster the development of new product lines and innovative services.
- 2. Consistent Data Governance: Ensure consistent data governance and compliance across various subsidiaries and business units.
- 3. Cross-Border Data Exchange Across Departments: Enhance collaboration and efficiency in departments like Finance and HR through the seamless exchange of data across regional boundaries.

#### 3c. External Application of Whitelabel

To drive data sharing with specified key industry players within your domain or region. Such as amongst public and private companies within a country to fulfil a national data exchange objective.

Possible participants: Government agencies (local, regional, national), Departments eg. urban planning, transportation, public health, Research institutions.

**Objectives:** 

- 1. Sustainable Urban Development: Leverage shared data on infrastructure, traffic, and public utilities to plan sustainable urban development projects.
- 2. Public Health Data Exchange: Facilitate secure sharing of non-sensitive public health data to address health challenges and epidemics.
- 3. Public Policy Formulation: Utilize comprehensive data analysis for informed public policy decisions, ensuring optimal use of resources for city development and public services.

#### 3d. Custom Application of Whitelabel

To build your community data marketplace within your ecosystem as a dedicated platform for your participants, such as an exclusive platform for the Healthcare Industry.

Possible participants: Hospitals, clinics, and healthcare providers, Research institutions and universities, Pharmaceutical companies.

**Objectives:** 

- 1. Anonymized Patient Data Sharing: Enable healthcare entities to exchange anonymized patient data for collaborative medical research.
- 2. Clinical Trial Data Exchange: Secure sharing of clinical trial data among research institutions and pharmaceutical companies.

3. Advanced Diagnostic Insights: Enhance healthcare analytics by sharing data to develop more advanced diagnostic tools and methodologies, leading to improved patient outcomes.

# Technology Behind

# 4a. Blockchain - Web3.0 & Smart Contracts

Powered by Blockchain Technology, Acentrik is built using Ocean Protocol Technology stack. It has two strong use cases: the first is to enable companies to exchange data over the Blockchain, the second is enabling companies to monetize data in a privacy-preserving manner.

As the core nature of Blockchain Technology, data exchanges on Acentrik are conducted in a decentralized manner. With transparency and immutability, this sets Acentrik apart from other data marketplaces – which is the promise of data sovereignty and ownership for actors on the marketplace. Facilitated by smart contracts, metadata of the data assets on the marketplace is stored encrypted. Furthermore, with the tokenization principle of Blockchain, assets on Acentrik are governed by ERC20 and ERC721 tokens. Access and management of individual assets are made possible and verifiable by the handling of such tokens.

#### 4b. Distributed Architecture

Acentrik is one horizontal technology, that can be deployed regardless of industries and geographical location. One of the core strengths of Acentrik is the ability to connect directly to data sources. That is made possible through its distributed architecture. For greater control, enterprises can choose to connect their private edge node infrastructure, compute jobs will run at their own environment. The private edge nodes can be hosted on any Kubernetes environment. In our upcoming subscription plans, as an enterprise you can choose to connect your private edge node infrastructure with support rendered from Acentrik Customer Success Team.



## 4c. Networks

Acentrik is EVM-compatible, currently in Enterprise Release, it is deployed on Polygon Mainnet. There may also be possible deployments to other EVM-based networks in the near future with considerations such as Hedera and Polygon Supernet. Acentrik also supports testing environments on the Goerli Testnet, Sepolia Testnet and Polygon Mumbai. These testnets provide developers with a sandboxed environment to try publishing their data assets without doing so directly on the production networks. This allows for a more controlled testing process with shorter wait times and faster transaction confirmations. By enabling developers to assess and validate their assets in accelerated testing cycles, they can make necessary adjustments or optimizations without risking actual assets on the production Blockchain network. This method enhances both accuracy and efficiency, ensuring that data assets are thoroughly evaluated before deploying them on the mainnet.

# **Conclusion**

As organizations keep up with the pace of the digital landscape, the need for greater data sharing grows by the day. Using the state-of-the-art technology to harness the value of data is a strategy that can fulfil business needs, ensuring ownership and control while achieving those goals. Acentrik strives to be that solution for organizations to build their data ecosystems, while driving adoption and scalability of technologies like Web3.

These are not all, further transformational features which bring greater real-world enterprise benefits will be released in the coming months. Such features enable a Web2-like experience to the Web3 ecosystem, encouraging greater Blockchain adoption and onboarding. In addition, Acentrik will be the first-in-market data exchange platform with federated compute – enabling algorithms to run simultaneously across multiple datasets from across regions at the same time, presenting an aggregated outcome.

Data has the potential to redefine business strategies, reshape industries, and rewrite success stories. But it requires more than just collecting data – it demands the vision to see data as an invaluable asset and the right tools to harness its power. With Acentrik leading the charge, the future of data-driven businesses is not just promising; it's transformative.

Get started in your data journey at <u>https://acentrik.io</u>, or simply connect with the team at <u>https://www.linkedin.com/company/acentrik/</u> for more collaboration and involvement opportunities.