Enterprise Strategy Group by TechTarget

SHOWCASE

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# Generative AI to Meet Sustainability Goals

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**Abstract:** Sustainability is being revolutionized through the integration of data, artificial intelligence (AI), and generative AI (GenAI), which can be extracted to accelerate the achievement of impactful change. Driven by a combination of worldwide government mandates, rising energy costs, corporate consciousness, and an urgency to act, organizations are turning to GenAI as a transformative tool to propel their environmental, social, and governance (ESG) initiatives. This convergence aligns with the increasing importance of IT sustainability practices reducing the environmental footprint of technology use. Recognizing a direct correlation between a strong ESG sustainability strategy and attracting environmentally conscious customers and employees, organizations are turning to GenAI to create a holistic path toward sustainability. Capgemini works with clients across key industries, leveraging GenAI in their data analytics ecosystem powered by Google Cloud and Fivetran tools. This partnership allows them to design, build, and run impactful environmentally conscious projects, helping organizations unlock GenAI's transformative potential for a more environmentally friendly future.

## Motivations and Objectives for ESG Sustainability

According to TechTarget's Enterprise Strategy Group research, ESG initiatives have had a direct and, in most cases, measurable impact on procuring technology solutions and customers making purchasing decisions. These drivers are propelling many organizations to act, with a majority of organizations (64%) believing that ESG will increase in importance or even become a requirement. Additionally, organizations report that customers and partners require them to apply ESG assessment to their suppliers (45%) and that they are committed to fairness (49%) and reducing their carbon footprint (51%).[1]

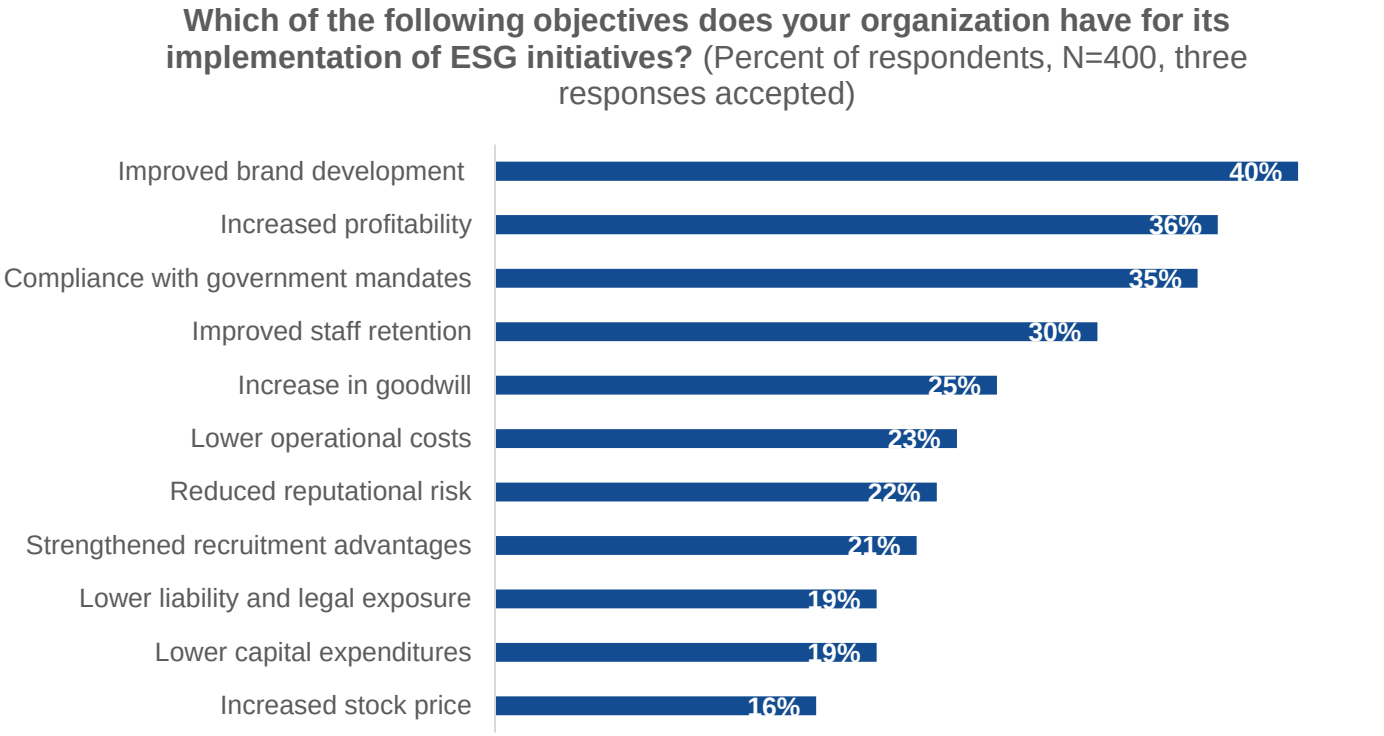
A summary of the motivations for sustainability initiatives varies by organization and includes the following:

- Benefits of reducing carbon footprints and promoting social equity.
- Expectations from customers, peer organizations, employees, and shareholders.
- Proactive pursuit of ESG compliance in anticipation of it becoming or already being a requirement.

Organizations understand the market and consumer drivers for sustainability, but what about the objectives and benefits they want to achieve by implementing solutions? When asked about the objectives organizations had for their implementation of ESG initiatives, respondents most often cited improved brand development (40%), followed by increased profitability (36%) and compliance with government mandates (35%; see Figure 1). These are all objectives where GenAI solutions can help.

[1] Source: Enterprise Strategy Group Research Report, *The Role of ESG Programs in IT Decision Making*, September 2022. All Enterprise Strategy Group research references and charts in this showcase are from this research report unless otherwise noted.

**Figure 1.** Primary Objectives for Implementation of ESG Initiatives




*Source: Enterprise Strategy Group, a division of TechTarget, Inc.*

## How GenAI Can Help With Sustainability Objectives

GenAI can help organizations meet their sustainability objectives in many ways, depending on the organization's specific goals and how they want to implement GenAI. Organizations can use GenAI to meet sustainability goals while also achieving corporate GenAI goals like performance, user experiences, cost savings, competitive advantages, and innovation.

### Climate and Environmental Impact

According to a Capgemini study on climate and how AI can power an organization's climate action strategy, we are experiencing an increase in extreme weather events, which can endanger lives and result in rising costs for governments and industry."[2] The study identified ten impactful use cases where GenAI can help. These offer significant benefits for organizations in terms of reduced greenhouse gas (GHG) emissions, improved energy efficiency, and reduced waste. Some examples include:[3]

- Tracking GHG emissions and tracing GHG leakages at industrial sites.
- Improving the energy efficiency of facilities and industrial processes.
- AI for designing new products that reduce waste and emissions during prototyping, production, and usage.
- AI for inventory management, improving demand planning and reducing wastage of food products and raw materials.

[2] Source: Capgemini, *Climate AI: How artificial intelligence can power your climate action strategy*.
[3] Ibid.

- Route optimization and fleet management for retail, automotive, and consumer products firms.

Other areas include:

- **Optimizing Resource Consumption:** GenAI can analyze vast amounts of data from sensors and operational systems to identify inefficiencies in energy, water, and material usage. This allows for targeted optimization strategies, such as predictive maintenance for equipment or real-time adjustments to production processes.
- **Supply Chain Sustainability**: GenAI can analyze supplier data and identify those with strong environmental practices. This empowers organizations to build sustainable supply chains, reducing their overall environmental footprint.
- **Circular Economy:** GenAI can support the transition to a circular economy by optimizing product design for recyclability and facilitating the reuse and refurbishment of materials. It can also predict product lifecycles and waste generation, enabling proactive waste management strategies.

## Getting to Net Zero

Getting to net zero in carbon emissions is a data problem. Capgemini helps customers account for their carbon emissions and overall impact by focusing on three streams, which they call the emission scope. Scope 1 deals with an organization's direct internal carbon impact; scope 2 focuses on the semi-indirect, often energy-related elements that are related to those direct impacts; and scope 3 centers on the things that happen upstream or downstream in the organization that enable the organization to produce and people to use the organization's product or services.[4] GenAI solutions that are developed with these scopes can effectively be used to help organizations accelerate their time to achieve net zero.

## Governance

- **Regulatory Compliance:** GenAI can analyze complex regulations and identify areas where organizational practices might not be compliant. This helps ensure adherence to environmental and social responsibility standards.
- **Transparency and Traceability:** GenAI can provide a detailed audit trail for decision-making processes, ensuring transparency and accountability in ethical considerations.
- **Risk Management:** GenAI can analyze data to predict potential environmental and social risks associated with operations, enabling organizations to take proactive mitigation measures.

## Customer Experience

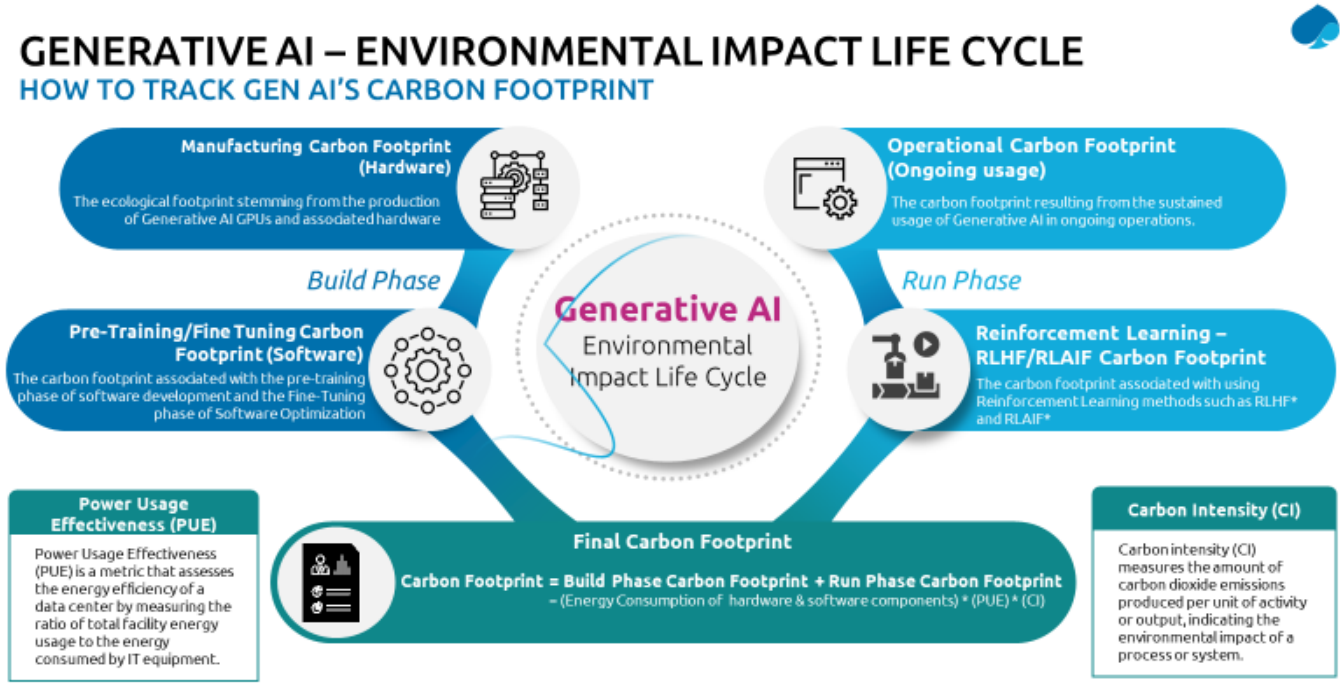
- **Sustainable Product Development:** GenAI can analyze customer preferences and market trends to inform the development of sustainable products and services, meeting evolving customer expectations.
- **Sustainable Consumption:** GenAI-powered chatbots and virtual assistants can guide customers toward more sustainable choices, such as suggesting eco-friendly travel options or highlighting environmentally responsible products.

## Sustainable GenAI Framework With Capgemini

Capgemini's sustainability practice, as shown in Figure 2, along with its expertise in GenAI, can help organizations build GenAI-enabled sustainability solutions using Fivetran for data movement and transformation, Google's infrastructure, BigQuery, and access to all the right AI tools. By implementing GenAI strategically and responsibly, organizations can make significant progress toward a more sustainable future while achieving corporate goals.

[4] Source: Capgemini, *Net-Zero is a foundation for Data Driven-Transformation*, September 2022.

**Figure 2.** Capgemini Sustainability Framework




*Source: Capgemini*

## Sustainable GenAI Framework With Fivetran:

GenAI applications can process massive amounts of data, raising concerns about their environmental impact. Fivetran's data integration capabilities play a crucial role in client mitigating this by ensuring the efficient and sustainable use of resources for GenAI projects. Here's how:

- **Operational Efficiency**: Fivetran automates data pipeline creation and management, ensuring efficient data flow and minimizing processing overhead. This translates to reduced energy usage for data processing tasks.
- **Efficient Data Management:** Fivetran eliminates unnecessary data transfers by selectively extracting only the relevant data required for GenAI training. This minimizes energy consumption associated with data movement across cloud environments.
- **Scalable Infrastructure:** Fivetran's cloud-based architecture scales automatically to accommodate growing data volumes for GenAI projects. This eliminates the need for additional physical infrastructure, which can be energy intensive.

By leveraging Fivetran, organizations can ensure their GenAI initiatives are powerful and environmentally responsible. This focus on optimizing data usage and minimizing resource consumption contributes to a more sustainable approach to AI development.

## Sustainable GenAI Framework With Google Cloud

Google Cloud is also uniquely positioned to help companies achieve their sustainability goals in two ways. Google Cloud has a reputation as the industry's cleanest cloud. Google is carbon-neutral today and plans to have all data centers running on carbon-free energy by 2030. Google also provides a collection of tools to help users accurately

report the carbon emissions associated with their Google Cloud usage and take action to reduce their carbon footprint. The Carbon Sense suite brings together features from multiple Google Cloud products, like Active Assist and Carbon Footprint, to help users everywhere make progress towards ensuring a healthier planet. Organizations can also take advantage of:

- Recommended regions with a higher average hourly carbon-free energy percentage.
- Optimizing cloud workloads by using elastic cloud services and autoscaling to minimize unused resources.
- Organizational policies set to restrict the location of cloud services to cleaner regions.

## How to Get Started With Enterprise Sustainability Goals

Much of the discussion surrounding GenAI concerns large language models (LLMs) such as Google Gemini, or foundational models (FMs). These are built on vast data sets of information, trained with AI algorithms, and are the core "intelligence" for AI. However, as an organization looks to use AI to maximize its value, including for ESG and sustainability initiatives, an organization's unique internal data is needed to build impactful solutions, that use the data needed to achieve sustainability goals.

The following is an example of how to build essential GenAI solutions using internal data, an LLM model, and other tools.

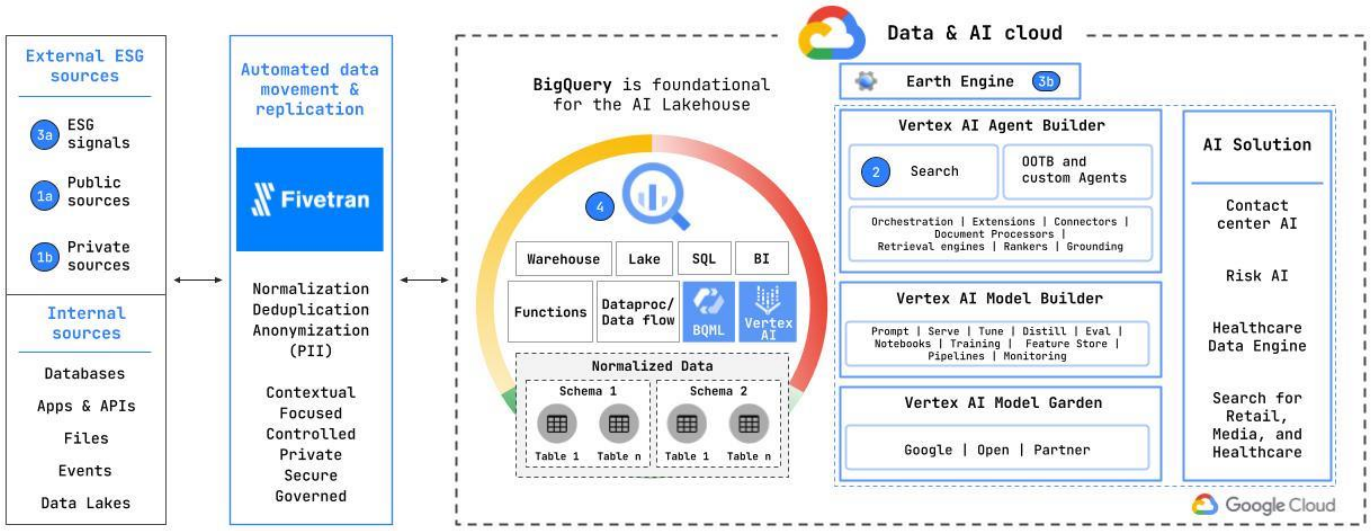
1. Design a strategy for achieving ESG goals and leveraging GenAI capabilities to accelerate the process or to extract the data needed to create unique GenAI solutions. An example might be the use of GenAI to analyze power consumption data from data center to find ways to reduce carbon footprint and lower costs. It is critical to begin by developing a clear strategy for achieving the company's mandates on achieving ESG goals and integrating GenAI across the organization.
2. Create an immersive workshop to launch the process. After idea creation and strategy, launch the plan in a workshop setting and bring in stakeholders from business and technology to align on what the minimum viable product, the roadmap, and teams are required to obtain value.
3. Build a data foundation for the project. The ability to integrate disparate data, automate data processes, and govern a data estate is essential to realize any value from GenAI. Fivetran facilitates this by efficiently moving, centralizing, sharing, and accessing data from hundreds of SaaS applications and databases through cloud-based platforms like BigQuery.
4. Develop and implement the GenAI solution. This involves assembling the data foundation with an LLM such as Google Gemini and a retrieval-augmented generation (RAG) technique. The LLM is a language model, and the data foundation gives it the contextual data to build differentiated and unique GenAI solutions.

## Implementing GenAI for Sustainability With Fivetran, Google Cloud, and Capgemini

Fivetran and Google Cloud partner to deliver GenAI solutions quickly and easily for every organization's use cases. GenAI's success depends on how well an organization uses its unique internal (domain-specific) data with LLMs, FMs, tools like RAG, and infrastructure, including storage, computing, data lakes, databases, and more. Capgemini adds extensive expertise in strategy and implementing GenAI solutions.

As shown in Figure 3 Fivetran accelerates the collection of data from over 500 data sources and extracts, transforms, and loads the data in a consistent way, regardless of the source. This is a critical process for operational data and GenAI, as it establishes the necessary data foundations for each unique GenAI solution being developed. This data can be moved into Google BigLake (Lakehouse) and Google BigQuery, which can be used for any purpose, including AI, GenAI, and much more. One of the key benefits of using Google BigQuery is that it has all the data management and AI tools to accelerate the development, testing, and implementation of AI solutions across organizations. Some core tools include Vertex AI and API access to LLMs like Google Gemini.

**Figure 3.** Fivetran and Google Data Movement Model




**Components Description:**

**1. Document sources**
- Pubic sources: Annual reports, sustainability reports, Industry news
- Private sources: Contracts, code of conduct, sustainability reports, negotiated pricing, supplier collaboration, portals, surveys, logistics partner data

**2. VertexAI Search** is a search platform for developers to build AI eagles, LLM-enriched, embedded, search capabilities, and vertical solutions.

**3. Sustainable sources**
- ESG signals, carbon footprint
- Google Earth Engine

**4. BigQuery** for analyzing ESG signals, carbon footprint and climate data analysis from Earth Engine

*Source: Fivetran*

## Fivetran: Data Integration From Source to Destination

Fivetran, a global leader in data movement, helps customers use their data to power everything from AI applications and ML models to predictive analytics and operational workloads. With the ability to seamlessly transfer data from over 500 source systems—including the databases that hold valuable proprietary, domain-specific data—to cloud platforms like Google BigQuery, Fivetran lays the foundation for building effective GenAI solutions.

From Oracle to SAP, Fivetran supports the world's largest workloads using various database replication methods. Using log-based change data capture, Fivetran can rapidly detect and replicate all data changes to the destination with a simple setup, efficient processes, and minimal resources. Fivetran also supports log-free database replication, using compressed snapshots to replicate data from supported sources to their destination with just a read-only user. Additionally, organizations can replicate large volumes of data in real time with Fivetran's high-volume agent database connectors. With Fivetran's 99.9% uptime, organizations can be assured that their pipelines are always running on schedule and that they have the freshest data from all their sources to fuel their GenAI applications.

## Google Cloud: Google Big Query, Vertex AI, and Gemini

Google Cloud offers all the infrastructure an organization needs to manage operational data and data ready to build out GenAI solutions, along with the tools and solutions to enhance and accelerate the time to value for AI solutions. Some of the core features include:

- **Google BigQuery.** BigQuery is Google's serverless, petabyte-scale data warehouse for analytics. With BigQuery, organizations can run analytics over large amounts of data, using standard SQL queries, to manage all structured and unstructured data types with strong access controls. BQML allows BigQuery users to build, train, and deploy ML models using simple SQL commands.
- **Google Vertex AI.** Vertex AI is a fully managed, unified AI development platform for building and using GenAI solutions. Organizations can access and use AI Studio, Agent Builder, and 130+ foundation models, including Gemini 1.5 Pro, all from Vertex AI. Vertex AI Agent Builder also enables developers to build and deploy enterprise-ready generative AI experiences quickly and provides the convenience of a no-code agent builder console alongside powerful grounding, orchestration, and customization capabilities. With Vertex AI Agent Builder, developers can quickly create a range of GenAI agents and applications grounded in organizational data.
- **Google Gemini.** Google Gemini is a multimodal model capable of processing information from multiple modalities, including images, videos, and text. The Gemini 1.5 Pro model is created to manage text, images, audio, PDFs, code, and video and can scale across a wide range of tasks with up to 1 million input tokens. Gemini is the first model to outperform human experts on massive multitask language understanding, one of the most popular methods to test AI models' knowledge and problem-solving abilities. An input token is a basic unit of text used by LLMs to process information. It's like breaking down a sentence into smaller pieces that the model can understand and manipulate. Each token represents a word, punctuation mark, space, or other element.

## Capgemini

Capgemini has four decades of experience and serves 1,800 clients worldwide, providing information technology, consulting, and outsourcing services. The company also offers digital services, technology solutions, cloud services, AI solutions, and cybersecurity and engineering services.

Capgemini clients are looking to measure their ESG footprint of consuming GenAI across five scenarios:

- **Using LLM as a Service:** LLMs are implemented through a cloud-based API. Google Gemini is an example of an LLM deployed in this manner.
- **Using LLM as a Service Through Hyperscaler:** Tailored for organizations already leveraging hyperscale cloud providers suited for users of leading hyperscale cloud platforms such as Google Cloud Platform.
- **Using Open Source LLM on Virtual Private Cloud:** Organizations can download and install open-source LLMs, such as Google's Vertex AI, within their own virtual private cloud.
- **Going On Premises:** Organizations can opt to procure and oversee their own hardware and software for LLMs.
- **Building Internal LLMs:** Organizations can choose to build their own LLMs from the ground up. This path is feasible primarily for organizations possessing a profound understanding of LLM technology and substantial resources.

Capgemeni's data and AI practices enables organizations to take advantage of the transformative power of data, AI, and GenAI. By becoming data-powered, organizations can adapt to the changing world and achieve a sustainable competitive advantage. With the world increasingly intelligent, with entire value chains being transformed, data is an essential source of understanding and insight for organizations. Capgemini can help organizations extract value.

## Conclusion

As organizations navigate the challenges and opportunities of integrating sustainability into operations, GenAI's role becomes increasingly important. Establishing a robust data foundation is not just a technical necessity; it's a strategic enabler that drives the successful implementation of GenAI solutions aligned with sustainability goals. GenAI can help organizations accelerate their sustainability goals by leveraging data in a unique and effective way to uncover the insights needed for impactful GenAI solutions.

The collaboration between Fivetran, Google Cloud, and Capgemini exemplifies how modern data management and AI tools can be leveraged to create impactful, sustainable solutions. By optimizing data integration and management, Fivetran ensures that organizations can trust their data's integrity and relevance, thereby enhancing the effectiveness of GenAI applications. These applications, in turn, enable organizations to innovate and operate more sustainably, achieving notable reductions in resource consumption and enhancing decision-making processes that favor environmental and social sustainability. Enterprise Strategy Group encourages organizations to engage with this team as a partner for GenAI's success.



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