

SOVEREIGN INTELLIGENCE

Make sense of the world's data so people can make better decisions.



Aurora® Technology Challenge Advantage



Introduction:

In 2014, Mark Johnson, a former clandestine intelligence officer and attorney, embarked on a groundbreaking mission. He founded Sovereign, assembling a remarkable team of Silicon Valley veterans, US/UK intelligence operators, and skilled product engineers.

Their collective vision birthed Aurora®, the world's first immersive enterprise platform designed for intelligence collection and analysis. Aurora® stands as a testament to innovation, providing an agile, AI-driven, Intelligence-as-a-Service (IAAS) solution capable of securely ingesting data from diverse sources.

This innovative platform is a catalyst for better decision-making within organisations. Aurora® is engineered to optimise efficiency, reduce costs, and conserve energy. Using the very latest innovation in proprietary AI data analytics our software enables national security analysts to interrogate global OSINT data to extract actionable intelligence in minutes.

1. Artificial Intelligence and Machine Learning Architecture
2. Assurance of Classified Information Sharing
3. Inconsistent Access to Data?
4. Advanced Data Querying
5. Single, Automated View of Data

1. Artificial Intelligence and Machine Learning Architecture

Aurora® offers a comprehensive solution that aligns with an organisation's intent to analyse various data types, develop algorithms, and streamline the AI and ML IT enterprise architecture. Here's how Aurora® meets these requirements:

- **Access to Existing AI Frameworks and Pre-Trained Models:** Aurora® is designed to provide access to existing AI frameworks and pre-trained models, enabling the organisation to jump-start diverse AI solutions. The platform's capabilities include ingesting any data through its Global Collection Network (GCN), which allows structured and unstructured OSINT data collection from multiple API sources. This vast data collection capability provides the foundation for AI model training and development.
- **Access to Existing Generative AI Domain Models:** Aurora® can offer access to existing Generative AI domain models for various data types, including image, audio, video, and conversational AI. These models can be seamlessly integrated and bound to the organisation's AI projects. Aurora® supports pre-post processing and prediction, allowing an organisation to leverage state-of-the-art AI models to enhance their capabilities.
- **Synthetic Media Generator and Catalogue:** While not part of Aurora®'s current architecture, we would partner with other SMEs to provide a synthetic media generator and catalogue that complements the organisation's digital assets. This feature would be supported by a microservice API framework and an open, standards-based multi-source plug-and-play architecture. Components from the catalogue could be reused as part of a generative AI workflow and combined within a multi-model modality pipeline. This approach promotes efficiency and flexibility in generating and managing synthetic media assets.

Aurora® incorporates advanced technologies such as deep reinforcement learning and Organic Learning (OL) to understand and process data. OL, a novel and proprietary machine learning technology, enables Aurora® to extract true meaning from complex datasets, aligning with an organisation's need for advanced AI capabilities. The platform also offers a gaming environment that engages users in a video game-like experience while conducting investigations. This immersive approach enhances the human ability to derive meaningful patterns from complex data and supports a continuous, discovery-based workflow.

- In summary, Aurora® provides an organisation with a robust and integrated solution that not only meets the organisation's intent but also offers cutting-edge AI capabilities, data access, and a user-friendly environment for enhanced productivity and analysis.

To expand on the role of Contextual Gravity in Aurora® in addressing an organisation's requirements:

- **Contextual Gravity:** Aurora® leverages an innovative concept called Contextual Gravity to facilitate the exploration and understanding of complex data relationships. Unlike traditional graph theory that operates in low-dimensionality, Aurora® visualises information relationships using elements of graph theory in multiple dimensions, including two-dimensional (2D), three-dimensional (3D), and even four-dimensional (4D) or more dimensions.
- This core concept allows Aurora® to display relationships based on a cost path model, determining layout distances among information relationships. Imagine information entities existing in a universe where multiple relationships determine how the universe is constructed and organised, visible to users from a distance.
- In traditional graph theory, higher path costs lead to less influence on the graph layout. However, Aurora® flips this concept to mimic gravity, where stronger gravity pulls objects closer together,

creating shorter paths between entities. Aurora® provides users with the ability to apply gravity in both normal (i.e., longer paths) and inverted (i.e., shorter paths) modes when organising data.

- Contextual Gravity self-assembles and visualises information as network relationships in multi-dimensional space. Layout distances are determined by a cost path model, providing users with detailed visualisations based on their navigational altitude. This innovative approach enables analysts to perceive data relationships in a manner that goes beyond traditional methods.
- Furthermore, all data structures within Aurora®, including locations, entities, nouns, verbs, categories, timelines, workflows, and meanings, possess contextual gravity toward other objects. This means that data elements naturally gravitate toward related entities, improving the understanding of intricate data connections.
- Contextual Gravity is a pivotal component in Aurora® that empowers an organisation's analysts to explore and decipher complex data relationships, aiding in their mission to gain insights and make informed decisions. This unique visualisation approach enhances the platform's overall usability and effectiveness in handling diverse data types and complex AI tasks.

2. Assurance of Classified Information Sharing

The Aurora: Intelligence-as-a-Service (IaaS)® platform aligns with the intent to classify information in various formats and offers solutions that cater to secure information sharing across diverse scenarios. To address the specific request for an end-to-end service that tracks, documents, and ensures the integrity of shared information without extensive infrastructure requirements or bespoke reprogramming for different data formats, Aurora® employs its Security-as-Code (SaC) approach.

- **Security as Code (SaC):** Aurora® adopts Security as Code (SaC) practices, which can be seamlessly integrated at an enterprise level. This approach builds security and access rules directly from business rules while maintaining version-controlled security measures. SaC enables code check automation, which can be localised to check-ins, fostering the principles of SECDEVOPS (Security Development and Operations) within the organisation. SECDEVOPS is a comprehensive methodology that incorporates secure coding practices into the heart of DevOps processes, ensuring that security is not treated as an afterthought but is instead an integral part of development and deployment. Unlike traditional security practices that are often seen as a burden on businesses, SaC integrates security into the DevOps pipeline, emphasising automation over manual processes.
- One of the key advantages of SaC is its ability to provide robust security measures, such as row-level database access controls, while also enabling the discovery of data existence. Users can perform semantic searches to identify relevant information without accessing specific results. This approach allows users to generate actionable insights from search results while maintaining data security and privacy.
- Aurora®'s implementation of SaC aligns with the intent to develop automated information sharing assurance tools that track information flow, document usage, detect tampering, and offer a generic service adaptable to various scenarios and data file formats. By embedding security into the development process and automating security checks, Aurora® ensures that sensitive information is protected throughout its lifecycle, without requiring bespoke reprogramming for different data types, thereby meeting the specified requirements.

In addition to the Security as Code (SaC) approach, Aurora® offers additional features that align with the intent to develop automated information sharing assurance tools and provide an end-to-end service for tracking, documenting, and safeguarding information sharing across various formats and scenarios. These features include:

- **Mission As Code:** Aurora® introduces the concept of "Mission As Code," which captures mission activities and actions in a structured, code-like format. Similar to workflow as code, Mission As Code operates at the interactive profile level, simplifying cross-mission salience and similarity. Users can begin by creating a Mission Briefing, selecting an Area of Focus (e.g., Person, Place, Organization, Concept, or Other), and defining the Mission Objective in text.
- They can inventory existing knowledge, upload relevant Files of Interest, specify Questions to Answer, and outline an ordered list of Checkpoints or steps to complete the Mission. Team members can be added to collaborate on the mission. Upon completion, users can choose from various Mission Report formats, such as editable word documents with a Narrative of Findings, .csv data tables, HTML reports, or playback videos of the entire workflow, which include gaming features. This feature streamlines the process of conducting and documenting missions while ensuring the security of shared information.
- **Gaming Environment:** Aurora® provides an immersive gaming environment that enhances the user experience and engagement during investigations and data exploration. This video game-like interface offers cutting-edge effects and visualisations of multidimensional data objects, allowing users to step into the narrative of their investigations. Users can interact with an AI guide and navigate through a digital data universe filled with concepts and objects. By presenting information graphically in this engaging format, Aurora® enhances human pattern recognition capabilities when dealing with complex data, supporting a continuous and discovery-driven workflow.
- This gaming environment operates as a productive learning environment that incorporates a shared contextual framework, enabling users to simulate social situations, including competition and cooperation among players. It aids in producing optimal decision-making actors in strategic and tactical settings, all while requiring minimal training and accommodating changing worker demographics. Moreover, it naturally incorporates Human-in-the-Loop protocols, where use cases are transformed into interactive Missions. This feature further enhances the usability and adaptability of Aurora® for various information sharing and analysis scenarios, making it a versatile tool for information assurance.

3. Inconsistent Access to Data?

Aurora® addresses this challenge via its **Global Collection Network (GCN)** and integrates with any existing tools. Aurora® is designed to address the challenge of bringing together diverse information and various data types, including structured and unstructured data, such as audio-visual content, financial records, and travel records. Aurora® achieves this by serving as a wraparound software tool that seamlessly integrates with an organisation's existing systems. It enables smoother access for analysts and automates the collation of information, identifying valuable insights. Importantly, this process is supervised by a human "in the loop."

- Aurora® leverages the GCN to ingest data from a wide range of sources, including open-source intelligence (OSINT) data and multiple APIs. The GCN employs human heuristics and behavioural simulations to drive the collection of new data based on mission workflows and target keywords or contexts.
- Additionally, Aurora® introduces the concept of "Contextual Gravity" to create an explorable environment for visualising information relationships. Unlike traditional graph theory, which operates in low dimensions, Aurora® uses graph theory elements to visualise information relationships in two, three, or even four dimensions. This innovative approach allows Aurora® to display relationships based on a cost path model that determines layout distances, similar to how gravity influences objects in the universe.

- In Aurora®, stronger "gravity" can be applied to pull related entities closer together, creating shorter paths between them. Users have the flexibility to apply normal or inverted gravity, depending on their preferences. This contextual gravity self-assembles and visualises information as network relationships in multi-dimensional space. Various data structures, such as locations, entities, nouns, verbs, categories, timelines, and workflows, all possess contextual gravity to other objects. Aurora® provides a unique and powerful visualisation of how data is interconnected across multiple dimensions, enhancing analysts' ability to explore and understand complex datasets.

To address the challenge of bringing together disparate information and a wide variety of tools and data while ensuring security, Aurora® employs a cutting-edge approach known as "Security as Code" (SaC). This approach aligns with the intent of providing a novel solution for data integration and security. Here's how Aurora® incorporates SaC into its solution:

- **Security as Code (SaC):** Aurora® integrates Security as Code (SaC) into its system, offering an enterprise-level security solution. SaC is built on the concept of automating security processes by generating security and access rules directly from business rules. These rules are version-controlled, ensuring that security remains consistent and auditable.
- Aurora® takes SaC further by enabling code check automation at the check-in stage, facilitating SECDEVOPS (Security Development and Operations). SECDEVOPS, also known as Rugged DevOps or Security at Speed and Scale, focuses on embedding secure coding practices deeply within the DevOps development and deployment processes. This approach ensures that security is not treated as an afterthought but is integrated into the entire development cycle.
- Traditionally, many companies adopt a DevSecOps approach, treating security as an add-on after the DevOps cycle. However, SaC shifts this paradigm by building security directly into the DevOps pipeline. It emphasises automation over manual processes and employs static analysis tools that specifically check the portions of code that have changed, rather than scanning the entire codebase. This approach enables the deployment of security measures in a repeatable, consistent, and version-controlled manner.
- The overarching goal of SaC in Aurora® is to provide security while allowing users to discover the existence of data without revealing specific results. For instance, users can perform semantic searches to identify relevant data, but they are not automatically granted access to view detailed results. This approach provides users with search results that can be further processed for lead generation or other purposes.
- In summary, Aurora® leverages Security as Code (SaC) to not only integrate and automate data collation and analysis but also ensure robust security measures that align with modern DevOps practices. This innovative approach enhances the organisation's ability to handle diverse data types and tools securely while maintaining a seamless user experience.

4. Advanced Data Querying

Via our Global Collection Network, (GCN), Aurora® deploys comprehensive data solutions that address the need to access and federate data from disparate databases located in different network domains, using various technologies, query syntaxes, and security models. Instead of relying on traditional federated query solutions, Aurora® adopts an alternative approach.

- Aurora® uses an organic data catalogue that provides insight into each data source, allowing it to correlate and repair data from both single and multiple information sources. It employs a

combination of established and proprietary artificial intelligence techniques, including Organic Learning, Reinforcement Learning, Deep Learning, and Machine Learning. These techniques enable Aurora® to produce high-quality outcomes while minimising errors that can occur when dealing with multiple sources and providers.

- One key advantage of Aurora® is its ability to recognize patterns in single sources of information and metadata by leveraging insights from multiple sources. This approach mirrors how humans naturally use multiple sources of information to make decisions and relate information to broader contexts based on their experiences or intuition. Aurora® rapidly trains its artificial intelligence to understand the characteristics and errors of individual information or metadata sources, adapting them to a common baseline to produce relevant and high-quality outcomes. Aurora® offers an innovative solution that enhances data correlation and quality by leveraging multiple sources of information and sophisticated artificial intelligence techniques, eliminating the need for traditional federated query methods.
- **Advanced Machine Understanding:** Aurora®'s proprietary machine understanding algorithm, **Organic Learning (OL)**, is a groundbreaking addition. OL is biologically-inspired and utilises a deep discrete neural network. It goes beyond traditional machine learning by allowing the system to understand ideas, context, and intent in a manner similar to human comprehension. This is particularly valuable for data querying, as it enables more nuanced and context-aware queries.
- **Language Agnostic and Unsupervised Learning:** Organic Learning is language-agnostic and operates in an unsupervised manner. This means it can process and understand data in multiple languages without the need for extensive pre-training or supervision. This flexibility is essential for querying diverse datasets that may contain information in various languages.
- **Improved Sensemaking Workflow:** The incorporation of Organic Learning substantially enhances the sensemaking workflow of analysts. It helps in making sense of complex data by identifying patterns, context, and intent, which in turn aids in formulating more effective and targeted queries.
- **Unique User Experience:** Aurora®'s innovative use of Organic Learning results in a unique and genre-breaking user experience. Analysts can interact with the platform in a more intuitive and efficient manner, making it easier to formulate and refine queries to extract meaningful insights from data.

5. Single, Automated View of Data

Aurora® offers a novel solution for developing situational awareness and understanding by automating the process of processing and combining data from various sources and formats. Instead of manually sorting and collating data from different systems, Aurora® streamlines this process. Here's how it addresses this challenge:

1. **Global Collection Network (GCN):** Aurora® has a Global Collection Network (GCN) that can ingest data from various sources, including structured and unstructured OSINT data, and multiple APIs. It operates based on human heuristics and behavioural simulation driven by mission workflows to identify new collection targets. This means that it continuously collects data in different formats from diverse sources, ensuring a constant influx of information.
2. **Contextual Gravity:** Aurora® rethinks traditional graph theory to visualise information relationships in multiple dimensions (2D, 3D, 4D, etc.). This approach allows Aurora® to display relationships based on a cost path model that determines layout distances, akin to how gravity affects the universe. The unique aspect is that Aurora® can apply "gravity" to pull related entities closer together, creating shorter paths, which is the opposite of traditional graph theory. This innovative visualisation helps analysts understand data relationships more intuitively.

3. **Data Processing Capabilities:** Aurora® leverages state-of-the-art artificial intelligence technologies, including deep learning. However, it introduces an exponentially advanced approach known as Organic Learning (OL). OL is a biologically-inspired, unsupervised machine learning technology for language understanding, enabling Aurora® to extract true meaning from complex datasets. This means that Aurora® not only processes data but also understands ideas, context, and intent in a manner similar to human comprehension.

4. **Enhanced User Experience:** The use of Organic Learning substantially improves the analyst's sensemaking workflow. This technology provides a unique and genre-breaking user experience, making it easier for analysts to make sense of large volumes of data and identify new insights as new data arrives.

In summary, Aurora® offers an automated solution that continually processes and combines data from various sources and formats, using advanced artificial intelligence techniques and innovative visualisation methods. This allows analysts to focus on analysis and assessments rather than manual data handling, thereby enhancing situational awareness and understanding.



www.sovereign.ai
discover@sovereign.ai
Sovereign Intelligence, LLC
Sovereign Intelligence Ltd is a company
registered in England and Wales with
company number #9911254
Sovereign Intelligence, K.K.