netsocs®

SYNERGY

BY NETSOCS

BEYOND CONNECTIVITY
AUTONOMOUS AGENTS..

Synergy 3.0

Unifying infrastructure through agentic orchestration and real-time convergence.

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Table of Contents

Synergy 3.0

Activate the Demo

Table of Contents

Synergy 3.0

Executive Overview

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Next-Gen Security Operations.

Our technical blueprint provides a concise yet comprehensive breakdown of the key features and autonomous capabilities of the Netsocs platform. Designed for forward-thinking stakeholders, this material validates our architecture, ensuring that every integration decision is backed by technical clarity and aligned with the future of intelligent infrastructure.

Quick Discovery & Core Value

Fast-track your technical review. This summary provides instant access to the specifications and benefits that define Netsocs, ensuring stakeholders gain a precise understanding of our ecosystem in seconds.

Growth & Revenue Enablement

A growth-ready framework designed to distill our disruptive advantages and fast-track market expansion across all platforms.

Market Differentiation

Enabling stakeholders to effortlessly validate Netsocs' architectural advantages against legacy solutions, ensuring a perfect fit for diverse business scales.

Engineering-First Clarity

Providing the technical clarity required to navigate complex infrastructure standards, ensuring seamless integration and optimized system uptim

Knowledge Architecture

Providing the technical clarity required to master Netsocs' underlying core systems. By demystifying autonomous technologies, we ensure that every user understands how to leverage our unified platform to its full potential.

Built for the visionaries leading the modern enterprise: Systems Engineers, IT Leaders, and consultants dedicated to mastering the convergence of physical and digital security infrastructure

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Netsocs Core Architecture

The Unified Integration Stack

Synergy 3.0
Next-Gen Security Operations.

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Technical Specifications

Server for Netsocs

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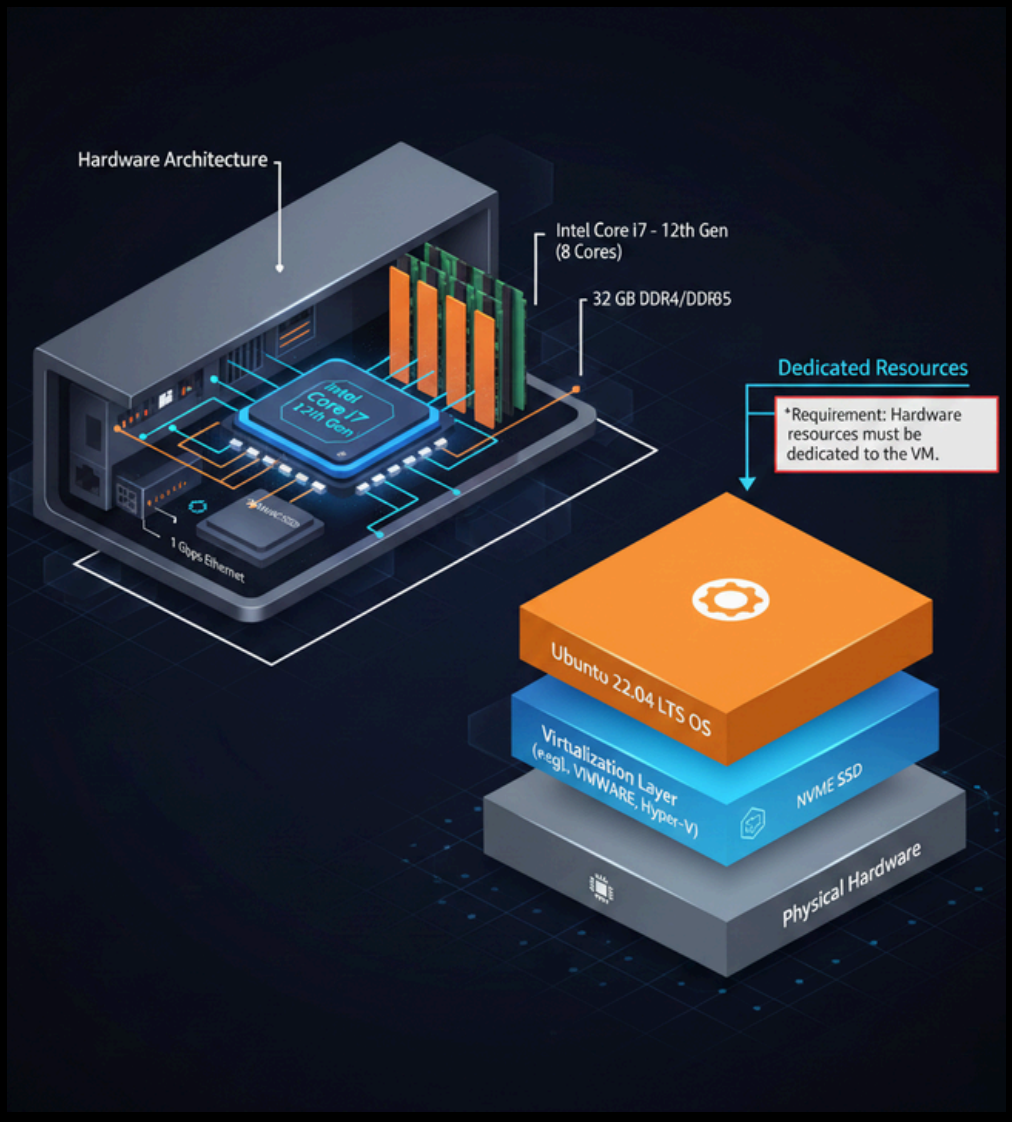
To ensure optimal performance and seamless operation during the Netsocs Proof of Value phase, the following system requirements are recommended

Recommended Hardware

- Processor (CPU): Intel Core i7, 12th Generation (or higher) with at least 8 cores.
- Memory (RAM): 32 GB DDR4/DDR5.
- Storage: 500 GB SSD (NVMe recommended for superior data throughput).
- Network Interface: 1 Gbps Gigabit Ethernet adapter.

Software & Virtualization Environment

- Native Operating System: Ubuntu 22.04 LTS.
- Virtualization Support: The system is fully compatible with virtualized environments hosted on Windows (e.g., VMware, Hyper-V, or VirtualBox). For virtual deployments, ensure that hardware resources are dedicated to the VM to maintain stability.
- Drivers: It is critical to ensure all hardware drivers are up to date and fully compatible with the Ubuntu 22.04 kernel.



Operational Scalability: These requirements serve as a standard baseline. Final configurations may be adjusted—requiring more or fewer resources—depending on the specific operational load, the number of integrated devices, and AI processing demands.

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Core Architecture
Engineered for Scale

Netsocs utilizes a distributed architecture based on microservices, complemented by purpose-built, specialized databases optimized for every use case. This modular framework provides total elasticity: components can run on a single server or be distributed across multiple nodes, ensuring the capacity to manage thousands of objects per installation with zero performance degradation.

Container-Native & Infrastructure Agnostic

We have decoupled the software from the underlying hardware. Every Netsocs component is engineered to run on Docker containers, making the platform truly cross-platform and future-proof. Whether at the edge or in the cloud, the environment remains consistent and secure.

Deployment Flexibilityc

Synergy 3.0 adapts to your specific security posture and operational requirements:

On-Premise: Full data sovereignty within local infrastructure for air-gapped or high-security environments.
SaaS (Software as a Service): Rapid deployment with centralized management and zero maintenance overhead.
Hybrid: The best of both worlds—local execution at the edge with global orchestration in the cloud.
Enterprise Scale: Native support for Kubernetes (K8s), enabling automated self-healing and elastic scaling for mission-critical workloads.

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Netsocs + Kubernetes

Unlocking Enterprise-Grade Orchestration

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Deploying Netsocs on Kubernetes (K8s) transforms the platform into a self-sustaining, mission-critical ecosystem. By leveraging K8s orchestration, Netsocs achieves a new tier of operational excellence:

01 Elasticity

Real-time scaling matched to live demand.

02 Resilience

Self-healing nodes and geo-distributed recovery.

03 Zero-Downtime

Seamless rolling updates and 24/7 availability.

04 Portability

Pure cloud-agnostic execution (AWS, Azure, On-Prem).

05 ROI

Optimized resource allocation and hardware efficiency.

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Component 01

The Access Layer

Seamless Ingress & Zero-Touch Security

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The Access Layer serves as the high-performance gateway between end-users and the Netsocs ecosystem. Engineered for fluidity, it provides a responsive interface across web and mobile platforms, ensuring a consistent operational experience.

Intelligent Routing

Powered by Traefik, our edge router dynamically orchestrates incoming traffic, directing requests to the appropriate microservices with microsecond precision.

Automated SSL/TLS

Zero-Touch TLS Automated HTTPS via Caddy and Let's Encrypt. Security is baked in, eliminating manual certificate management and overhead.

Enterprise Flexibility

Full support for custom PKI and private CAs across air-gapped or restricted network topologies.

Component 01 (Client)

The Access Layer

Seamless Ingress & Zero-Touch Security

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The "Site" is our distributed gateway architecture, engineered to bridge the gap between geographically dispersed hardware and your central core. It enables seamless integration across any network topology, turning remote locations into intelligent nodes.

Protocol-Agnostic Integration

Specialized bidirectional drivers translate central commands into native device language in real-time. Whether it's Modbus, BACnet, SNMP, or proprietary protocols, Netsocs ensures high-fidelity communication with any asset.

Fail-Safe Edge Resilience

Connectivity is never a single point of failure. Each site features local event buffering, capturing and storing telemetry during network outages.

Automated Data Sync

Once connectivity is restored, the system performs an autonomous high-speed synchronization, ensuring absolute data integrity with zero information loss.

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Component 01 (Client)

The Access Layer

Seamless Ingress & Zero-Touch Security

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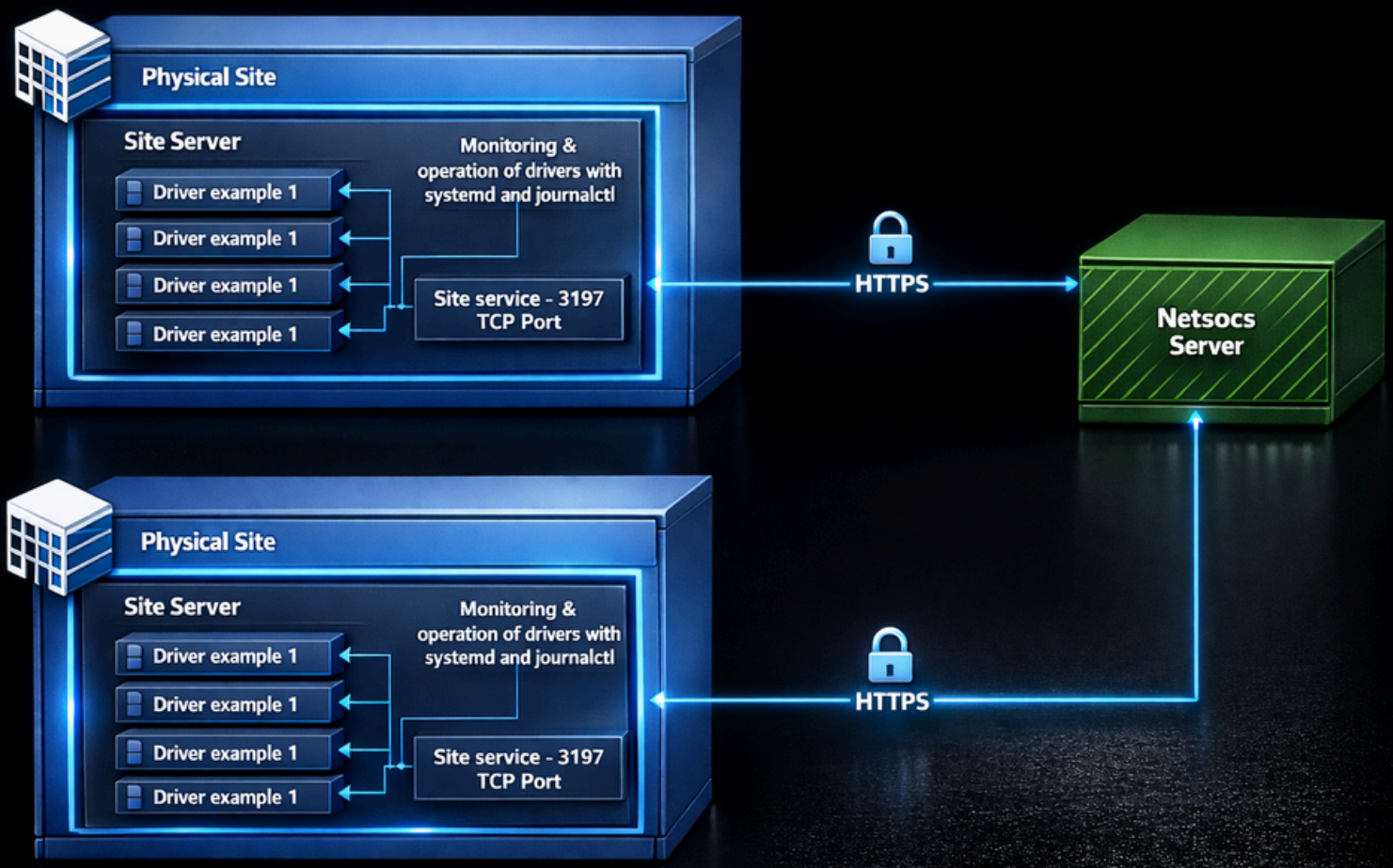
Remote Deployment Model



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Component 02 (Driver)

The Integration Engine

Native Protocol Orchestration & Bi-directional Logic

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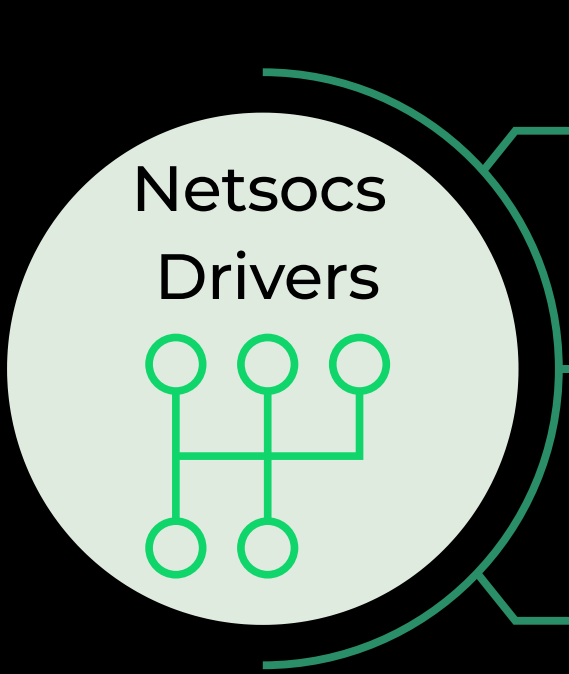
Netsocs Drivers serve as the specialized translation layer between the system's core logic and physical field assets. Each driver is a high-performance software unit engineered to communicate natively with devices using industry-standard protocols (Modbus, BACnet, SNMP, OPC-UA, and beyond).



Command Execution & Translation

Real-time processing of central instructions such as setpoint adjustments or actuator triggers translated instantly into device-specific machine code.

High-Fidelity Telemetry

Granular capture of edge data, including critical alarms, millisecond state changes, and environmental variables.

Closed-Loop Feedback

Aggregated data is streamed to the local Site gateway, ensuring the central core maintains a real-time, accurate twin of the physical environment.

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Component 02 (Driver)

The Integration Engine

Native Protocol Orchestration & Bi-directional Logic

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Next-Gen Security Operations.

The Driver Operational Loop

1 Command Ingress

The driver receives high-level instructions from the Netsocs core ranging from setpoint adjustments to active hardware triggering with microsecond latency.

2 Autonomous Translation

Commands are instantly converted into native machine protocols (Modbus, BACnet, etc.) and executed directly on the physical asset.

3 High-Resolution Capture

The driver receives high-level instructions from the Netsocs core ranging from setpoint adjustments to active hardware triggering with microsecond latency.

4 Command Ingress

The driver receives high-level instructions from the Netsocs core ranging from setpoint adjustments to active hardware triggering with microsecond latency.

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Component 02 (Driver)

The Integration Engine

The Driver Certification Framework

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Engineering Rigor for Seamless Deployment

1. **Integration Benchmarking**
   Full documentation of stress tests, scenario-based validation, and verified performance results.
2. **Object & Schema Mapping**
   Detailed definition of all data points and virtual objects automatically provisioned within the Netsocs environment.
3. **Architectural Visualizations**
   High-fidelity communication diagrams and data flow topologies between the field asset and the core.
4. **Operational Guardrails**
   Precise technical requirements, environmental constraints, and battle-tested configuration best practices.
5. **Operator Insights**
   Mission-critical operational details and functional guidance designed for the end-user experience.

Every Netsocs driver undergoes a **rigorous** validation process, backed by a comprehensive Certification Protocol. This ensures absolute transparency and flawless execution for every integration

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Component 02 (Driver)

The Integration Engine

Mission-Critical Integrity:
The Fail-Safe Standard

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Drivers are the vital link between system logic and physical hardware. Because their availability is paramount to operational uptime, Synergy 3.0 is engineered for high-resilience and zero-downtime. We recommend the following protocols to ensure 24/7 continuity

1 Multi-Node Redundancy

Eliminate single points of failure by deploying redundant driver instances across distributed Sites or independent server clusters.

2 Active Observability

Implement real-time monitoring and proactive alerting to detect and mitigate connectivity fluctuations before they impact the end-user.

3 Self-Healing Workflows

Design event-driven automations for instant remediation, including automated reconnection cycles, failover triggering, and mission-critical notifications.

4 Predictive Health Audits

Leverage deep log aggregation and performance metrics for proactive maintenance, ensuring the integration engine is always tuned for peak efficiency.

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Component 03 (Service Tier)

The Command Center

Unified Visualization & Real-Time Orchestration

Synergy 3.0

Next-Gen Security Operations.

Next-Gen Interface Standards

The Netsocs UI is a high-performance, web-native Control Plane designed for mission-critical operations. It provides a centralized, high-fidelity environment where operators and administrators transform complex data into actionable intelligence.

Context-Aware Responsiveness

Engineered to adapt fluidly across desktop, tablet, and mobile. The UI dynamically restructures its layout to maximize operational efficiency on any screen size.

Zero-Installation Agility

A true cross-platform experience. Access the full power of Synergy 3.0 from any OS (Windows, macOS, Linux, iOS, Android) via any modern browser no local software overhead required.

Touch-Optimized Precision

Beyond simple clicks, the interface is built for field-ready interaction. Tactile controls and gestures ensure rapid, error-free operation on tablets and mobile devices.

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Component 03 (Service Tier)

The Command Center

Unified Visualization & Real-Time Orchestration

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Next-Gen Security Operations.

High-Value Operational Modules

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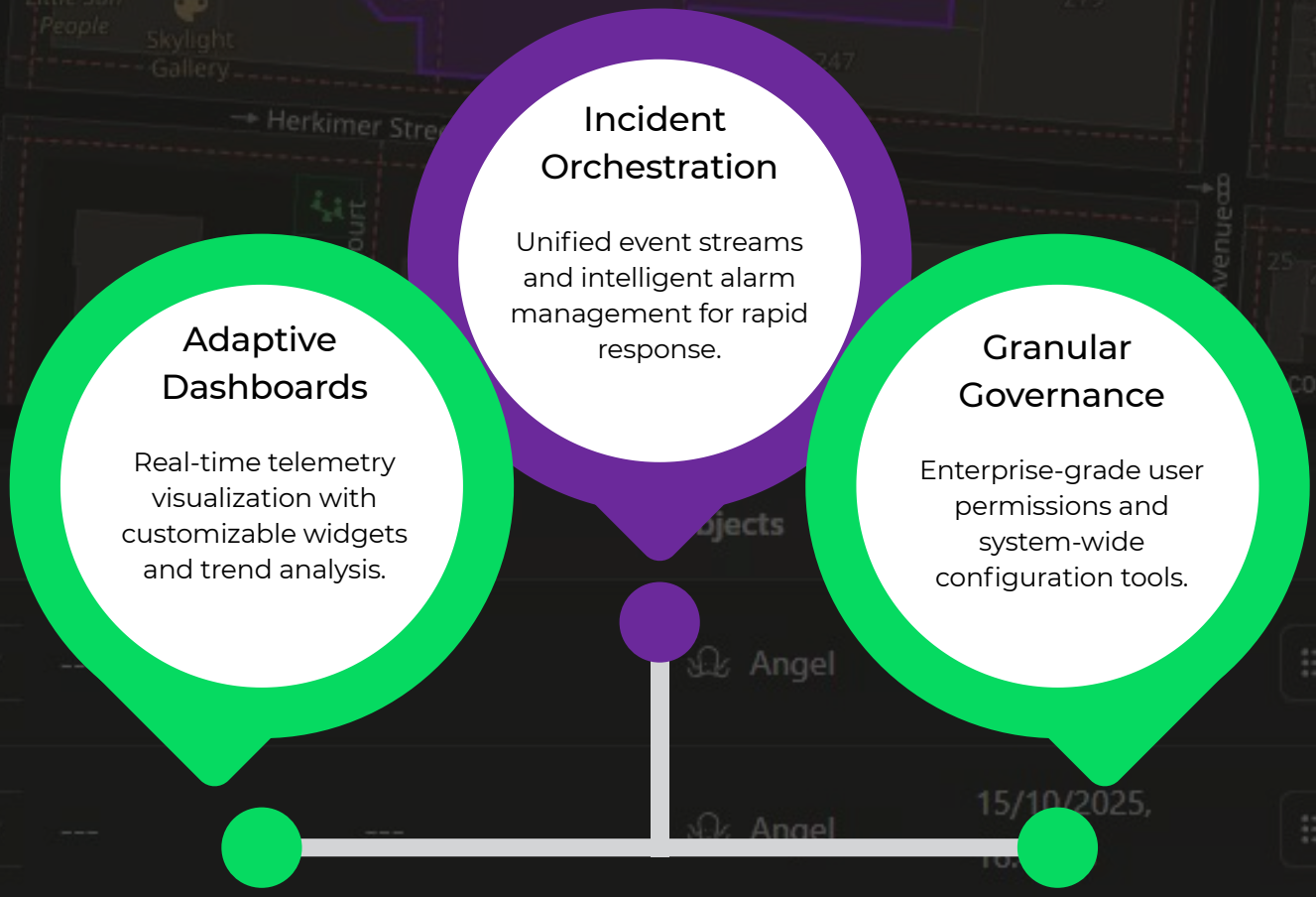

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Component 03 (Service Tier)

DriverHub Core

The Nerve Center for Global Orchestration

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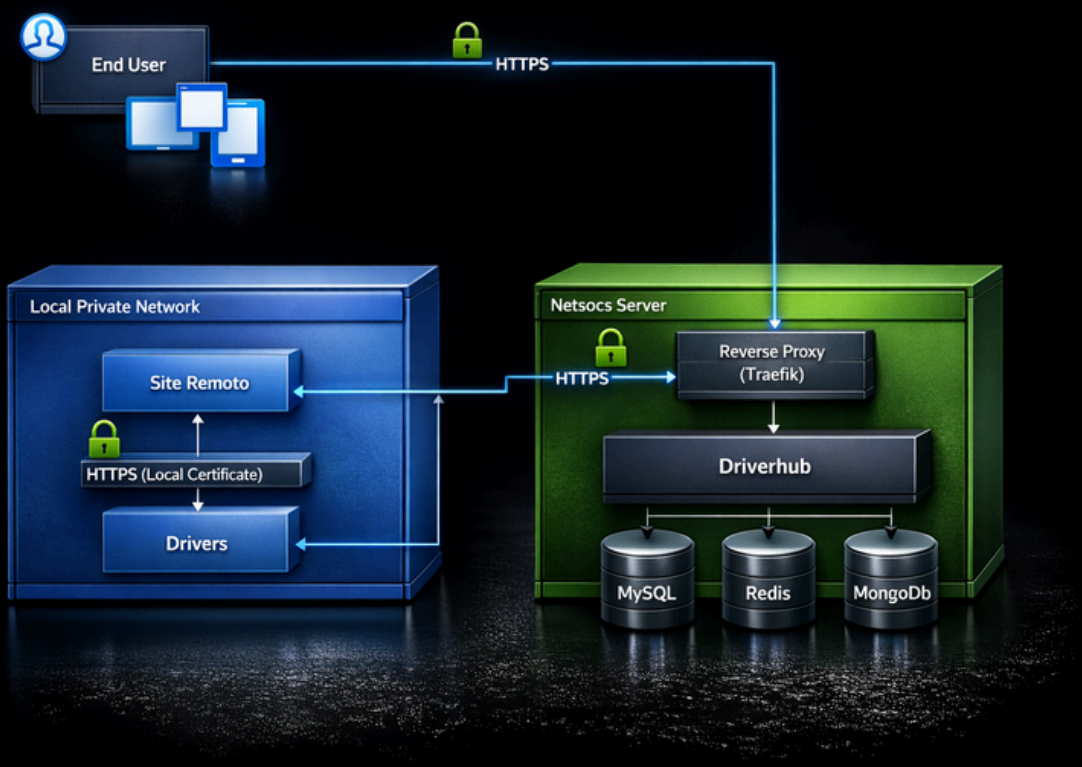
DriverHub is the architectural cornerstone of Netsocs, engineered to orchestrate the complete lifecycle of field integrations. As the system's central intelligence, it coordinates high-speed, bi-directional telemetry between the core platform and distributed sites, ensuring total operational coherence across the entire infrastructure.



Massive-Scale Ingestion Built to process and normalize millions of concurrent data points, providing high-fidelity visibility into every connected asset in real-time.

Unified Driver Orchestration Synchronizes distributed driver logic with microsecond precision, maintaining absolute consistency across fragmented or global hardware environments.

Deterministic Logic Engine Manages complex command workflows and feedback loops, ensuring the stability and integrity of every hardware integration regardless of its scale or complexity.

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Component 03 (Service Tier)

DriverHub Core

Deterministic Execution & Precision Control

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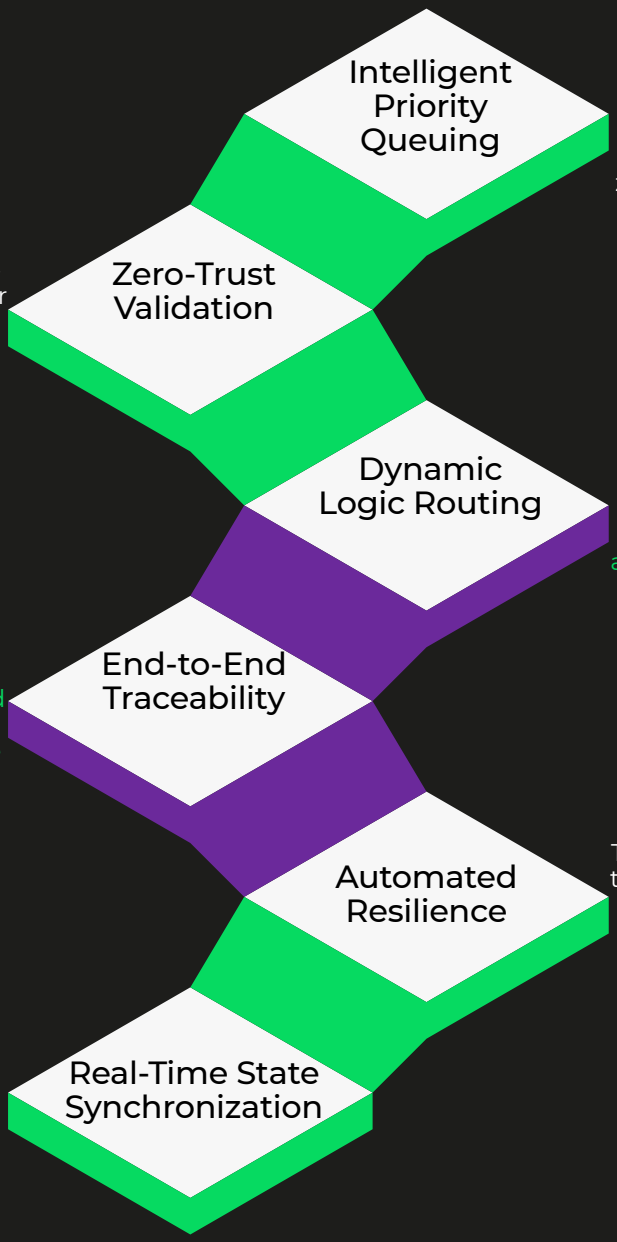
Next-Gen Security Operations.

The DriverHub manages the complete lifecycle of commands dispatched to field drivers, ensuring that every instruction is delivered securely, prioritized correctly, and executed with absolute transparency.



Dynamically manages incoming commands from UIs, APIs, or automation engines. Instructions are prioritized based on mission-criticality and logical dependencies to ensure zero-latency execution for high-priority events.

Every action undergoes a rigorous pre-execution check, verifying granular user permissions, parameter integrity, and operational safety constraints.

Automatically identifies the optimal path and the specific driver/site instance required to reach the physical asset, regardless of network complexity.

Real-time monitoring of the entire command lifecycle—from pending and in-flight to success or failure, with detailed timestamps and performance metrics.

To combat transient network instability, the system implements intelligent retry policies with exponential backoff, ensuring command delivery without saturating the network.

Instant processing of hardware feedback, updating the system's "Single Source of Truth" the moment a command is confirmed by the field device.

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Component 03 (Service Tier)

DriverHub Core

Distributed Site Orchestration

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Next-Gen Security Operations.

The DriverHub acts as the primary controller for your entire network of distributed Sites. It provides a unified management plane to ensure every remote node is healthy, updated, and performing at peak efficiency.

Real-Time Fleet Inventory Automated discovery and registry of all active Sites. Maintain a live catalog of hardware capabilities, software versions, and active driver instances across your entire global footprint.

Proactive Health Observability Continuous monitoring of mission-critical metrics, including connectivity status, network latency, and resource utilization (CPU/RAM). Detect anomalies before they impact operations.

Automated Configuration Sync Deploy security credentials, operational policies, and configuration updates across the fleet instantly. Ensure total uniformity and compliance without manual onsite intervention.

Resilient Connectivity Logic Intelligent handling of intermittent network conditions. The system manages state-synch and command-buffering during outages, ensuring zero data loss and seamless recovery once connectivity is restored.

Elastic Load Balancing Optimized distribution of operational workloads across redundant Site configurations, maximizing hardware efficiency and ensuring high availability (HA) for critical environments

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Component 03 (Service Tier)

DriverHub Core

Global Audit & Compliance Engine

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Next-Gen Security Operations.

Netsocs doesn't just log data; it builds an authoritative ledger of your entire operation. Our audit engine is structured across three critical dimensions to ensure total transparency and system integrity.

Operational Accountability

User Interaction Ledger A high-fidelity record of every operator action, identifying who, what, when, and from where, ensuring total visibility into human-system interaction.

Configuration Integrity Real-time tracking of every modification across sites, drivers, and system parameters to eliminate unauthorized "configuration drift."

Deep-Stack Forensics

Command Provenance End-to-end documentation of the command lifecycle, tracing every instruction from its origin point to its final execution on the physical asset.

- Ingress Intelligence Continuous monitoring of successful and failed access attempts, providing the telemetry necessary to identify and neutralize credential-based threats.

Regulatory & Data Sovereignty

- Standards-Ready Infrastructure Native design to streamline adherence to global and industrial regulations, including GDPR, SOC 2, and specific critical infrastructure mandates.
- Dynamic Retention Policies Fully configurable log-lifecycles, allowing you to balance operational history requirements with legal and storage constraints.

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Component 03 (Service Tier)

DriverHub Core

State Integrity & Synchronous

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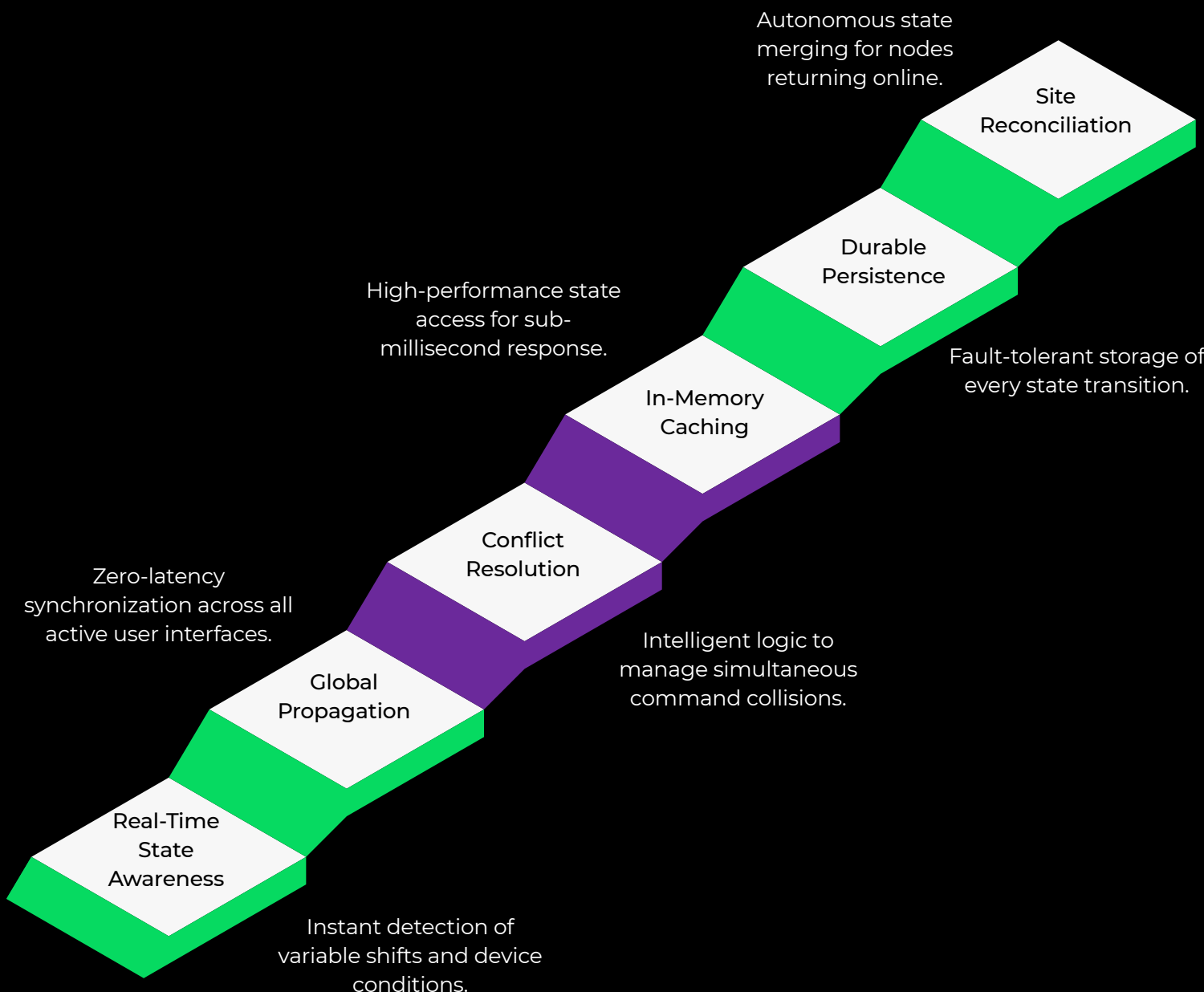
The DriverHub is the definitive authority for system-wide state management. It ensures that every object, from a single sensor to a complex actuator, remains synchronized, consistent, and resilient across the entire infrastructure.



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Component 03 (Service Tier)

DriverHub Core

Business Intelligence & Reporting

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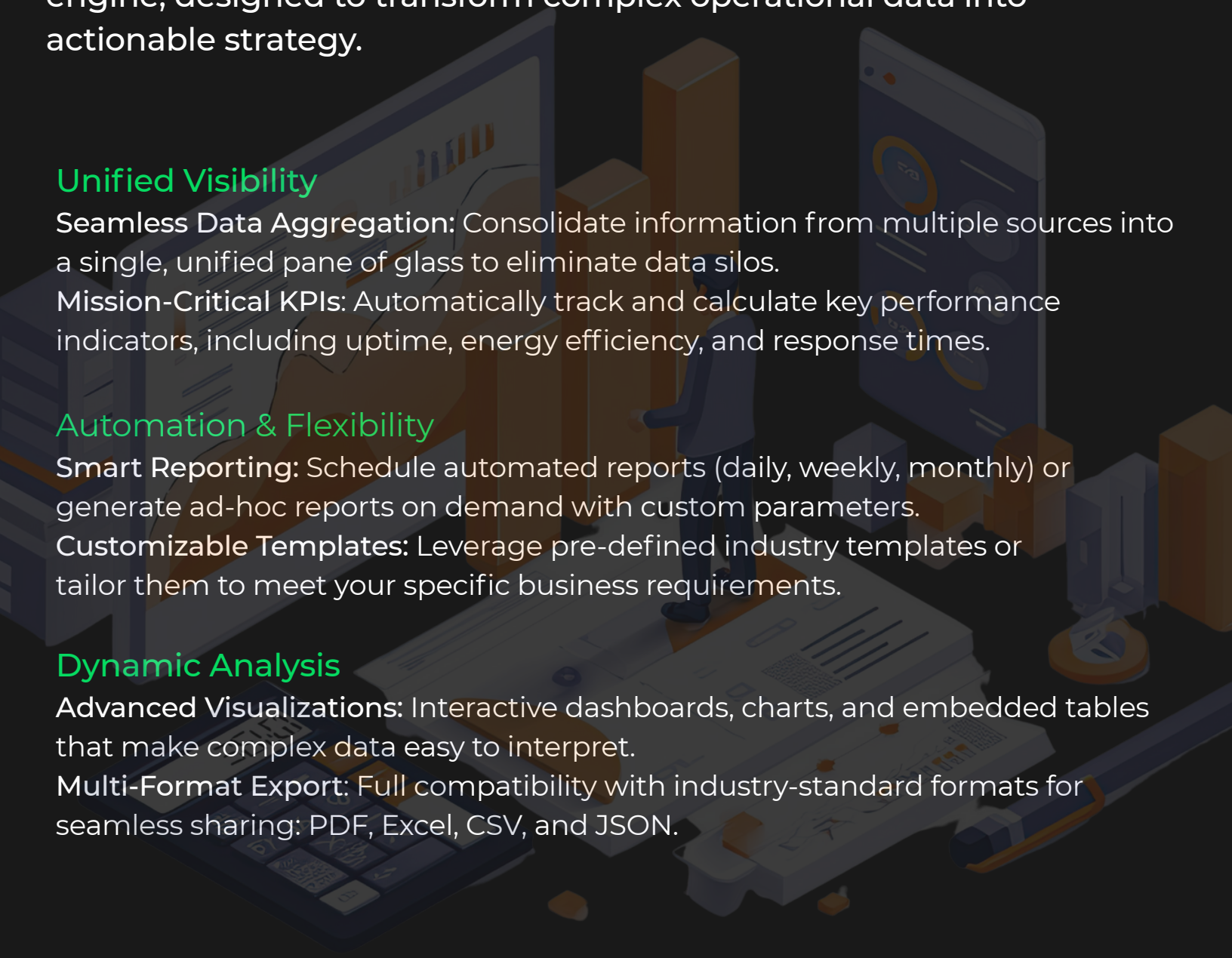
Empower your decision-making with DriverHub's advanced analytics engine, designed to transform complex operational data into actionable strategy.



Unified Visibility

Seamless Data Aggregation: Consolidate information from multiple sources into a single, unified pane of glass to eliminate data silos.

Mission-Critical KPIs: Automatically track and calculate key performance indicators, including uptime, energy efficiency, and response times.

Automation & Flexibility

Smart Reporting: Schedule automated reports (daily, weekly, monthly) or generate ad-hoc reports on demand with custom parameters.

Customizable Templates: Leverage pre-defined industry templates or tailor them to meet your specific business requirements.

Dynamic Analysis

Advanced Visualizations: Interactive dashboards, charts, and embedded tables that make complex data easy to interpret.

Multi-Format Export: Full compatibility with industry-standard formats for seamless sharing: PDF, Excel, CSV, and JSON.

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Component 03 (Service Tier)

DriverHub Core

Predictive Operations & Machine Learning

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DriverHub leverages cutting-edge AI to move beyond reactive management, enabling a smarter, more efficient infrastructure that anticipates needs before they arise.

Intelligent Forensics & Maintenance

- Anomaly Detection: Identify unusual behavior patterns in real-time to pinpoint potential device failures before they occur.
- Predictive Maintenance: Analyze historical trends to accurately forecast maintenance windows, reducing downtime and extending equipment lifespan.

Smart Resource Optimization

- AI-Driven Energy Savings: The system learns consumption patterns to suggest and implement high-impact energy optimization strategies.
- Load Forecasting: Anticipate future demand by correlating historical data with contextual variables such as weather, occupancy, and scheduling.

Actionable Intelligence

- Proactive Recommendations: Receive data-backed suggestions that guide operators toward the most efficient and secure course of action.
- Continuous Learning: Our Machine Learning models constantly evolve, becoming more precise as they process more of your operational data.

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Authentication & Authorization

Protocols and Functionality Matrix

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We’re abstracting away the friction of identity management by deploying a battle-tested, protocol-agnostic framework that scales from day zero. This matrix isn't just a feature set; it’s a high-availability security backbone designed to consolidate user flow and eliminate auth-debt. We’re basically turning complex compliance into a seamless, 'plug-and-play' competitive advantage.

Category	Feature	Description
Core Protocols	SAML 2.0	Full support for exchanging authentication and authorization data between security domains.
	OpenID Connect (OIDC)	An identity layer on top of the OAuth 2.0 protocol for modern authentication.
	OAuth 2.0	Industry standard for API authorization delegation.
Federation	Identity Brokering	Ability to delegate authentication to external providers (Google, GitHub, Facebook, etc.).
	User Federation	Synchronization with existing user databases such as LDAP or Active Directory.
Security	Single Sign-On (SSO)	A single login to access multiple connected applications.
	Single Sign-Out	Centralized logout across all linked applications.
Management	Multi-Factor (MFA)	Native support for OTP (Google Authenticator, FreeOTPP amo) and WebAuthn.
	User Self-Service	A portal for users to manage their own accounts, passwords, and sessions.
	Role-Based Access (RBAC)	Permission assignment based on hierarchical roles and groups.

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Enterprise Architecture

Built on Standard IT Excellence

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Next-Gen Security Operations.

DriverHub leverages industry-leading, proven technologies to ensure seamless integration, maximum uptime, and a future-proof infrastructure.

Docker: Containerized Scalability

We utilize Docker to isolate application processes, ensuring our software runs consistently across any environment.

Infrastructure Portability: Rapid, "plug-and-play" deployment across Cloud, Hybrid, or On-premise environments.
Process Isolation: Eliminate dependency conflicts and versioning issues for a cleaner, more secure system.
Resource Efficiency: High-performance execution with a significantly lower footprint compared to traditional virtual machines.

MySQL: The Foundation of Data Integrity

For relational data persistence, we rely on MySQL (Version 8.0+), the global standard for reliability and performance.

The Single Source of Truth: A centralized repository for user management, system metadata, and transactional records.
ACID Compliance: Guaranteed data integrity and reliability for mission-critical operations.
High-Performance Workloads: Optimized for intensive read/write operations, ensuring zero latency in data-heavy environments.

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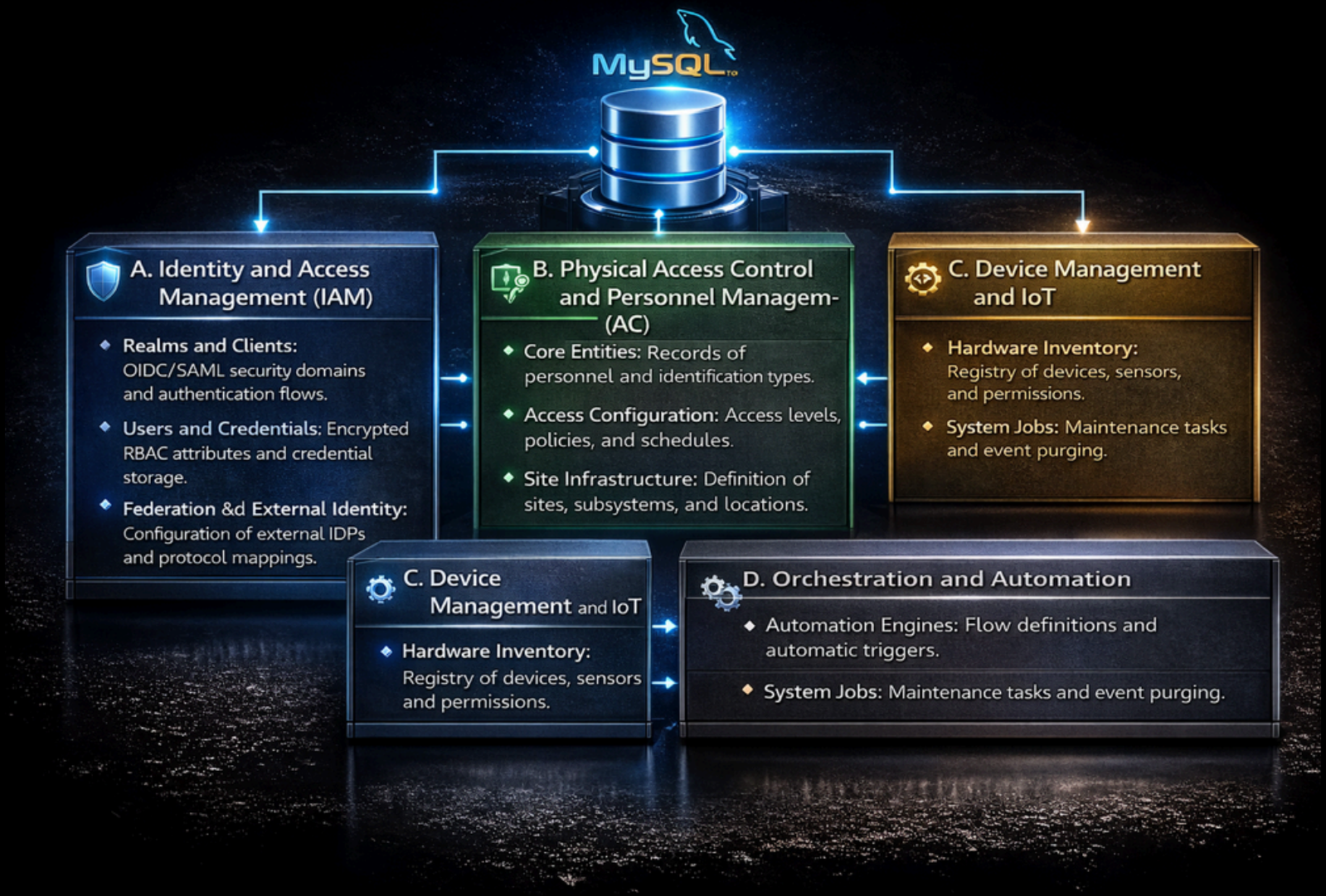
Configuration and Optimization

To ensure the service remains predictable and fast, we have implemented the following key configurations:

Parameter	Configuration	Justification
Engine	InnoDB	Support for transactions and crash recovery.
Charset	utf8mb4	Full compatibility with emojis and international characters.
Max Connections	150	Load control to prevent RAM saturation.
Connection Pool	Managed by the App	Avoids the overhead of constantly opening and closing connections.
Management	User Self-Service	A portal for users to manage their own accounts, passwords, and sessions.
	Role-Based Access (RBAC)	Permission assignment based on hierarchical roles and groups.

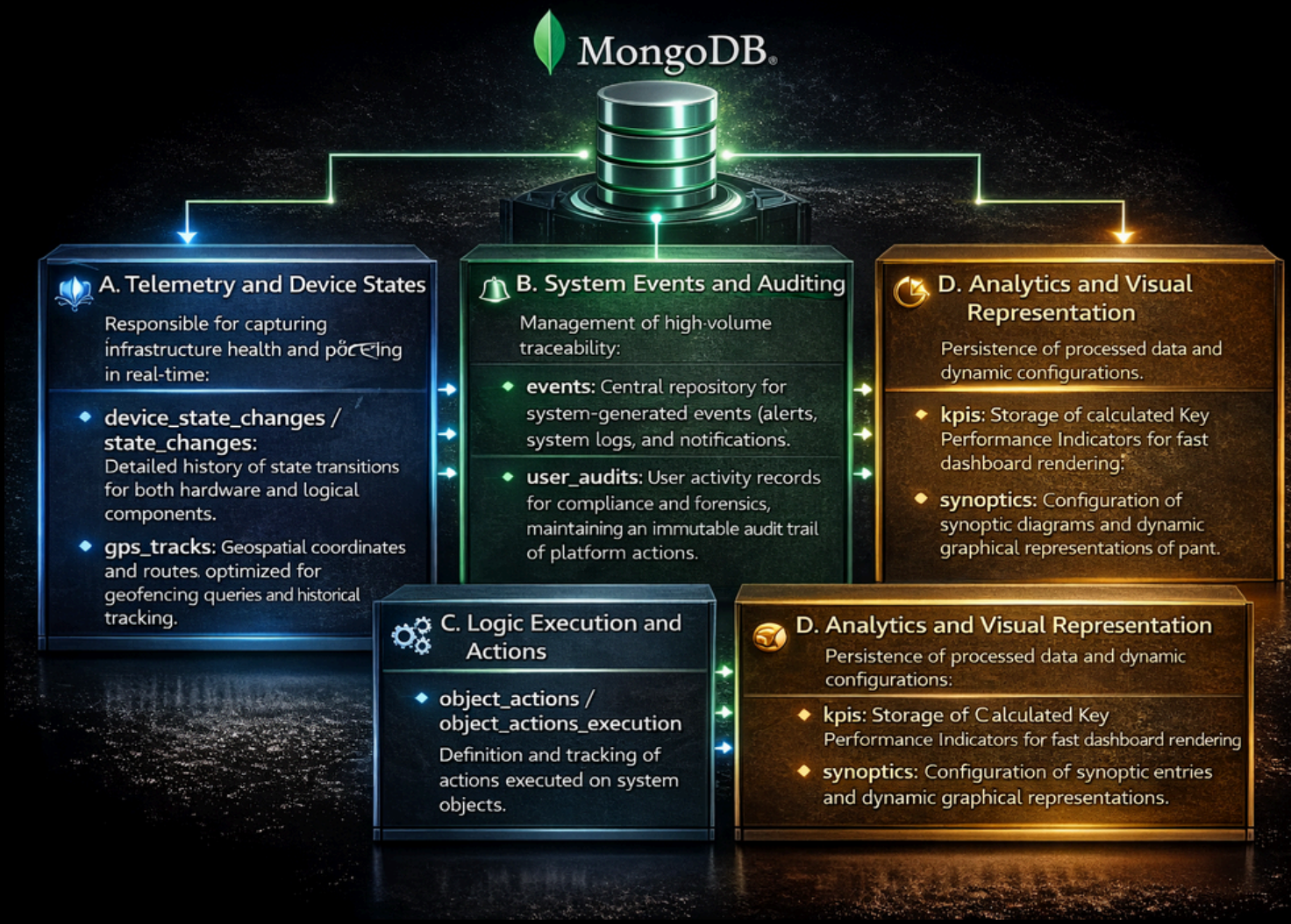
Data Domains and Persistence Responsibilities

The MySQL engine serves as the central relational repository, managing critical states distributed across five main domains. It is not utilized for massive unstructured data; instead, its primary role is to ensure the referential integrity of business logic and security.



Data Domains and Responsibilities

Unlike the RDBMS, MongoDB collections are optimized for write-intensive operations and time-series queries. Data is grouped into the following functional domains



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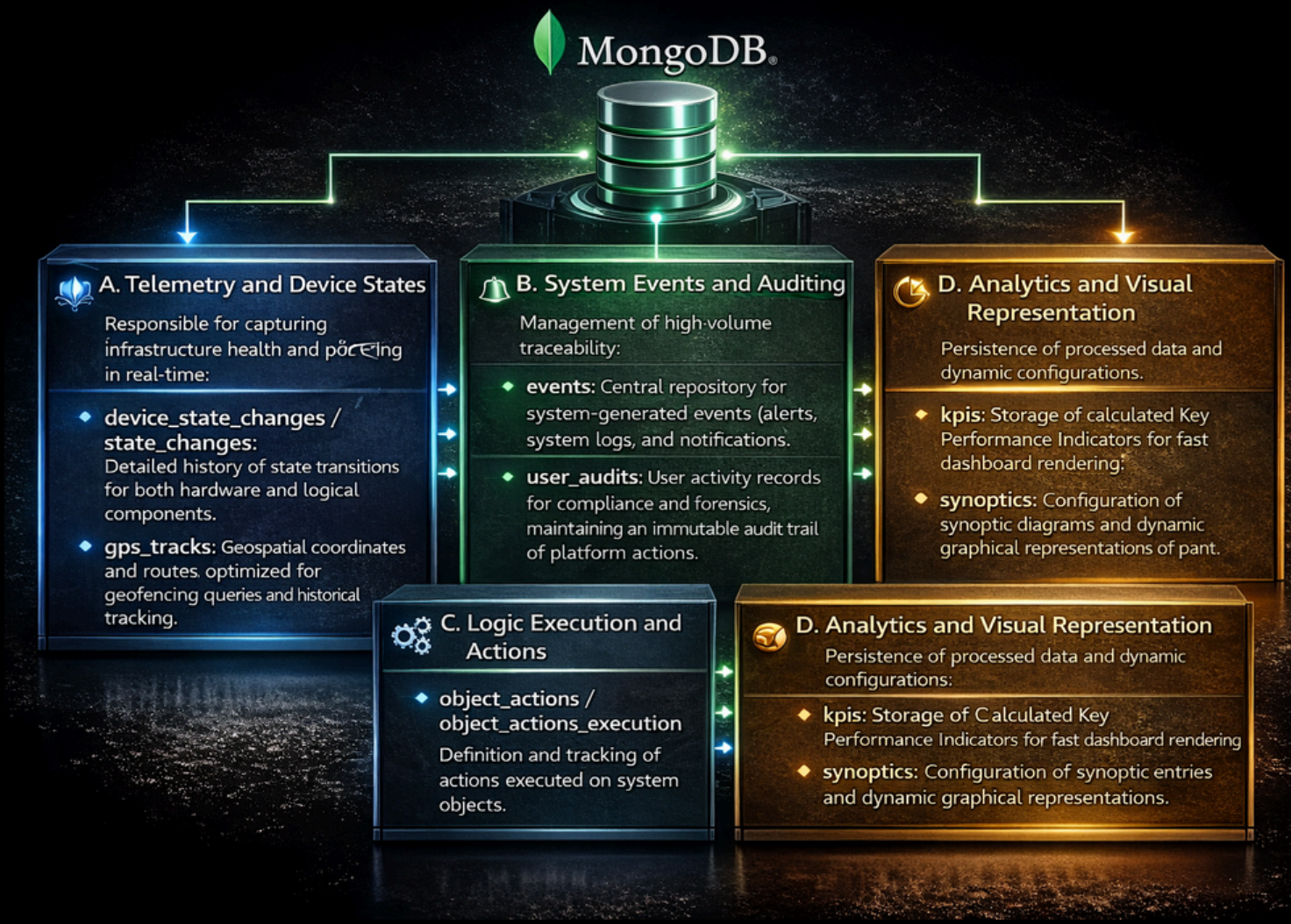

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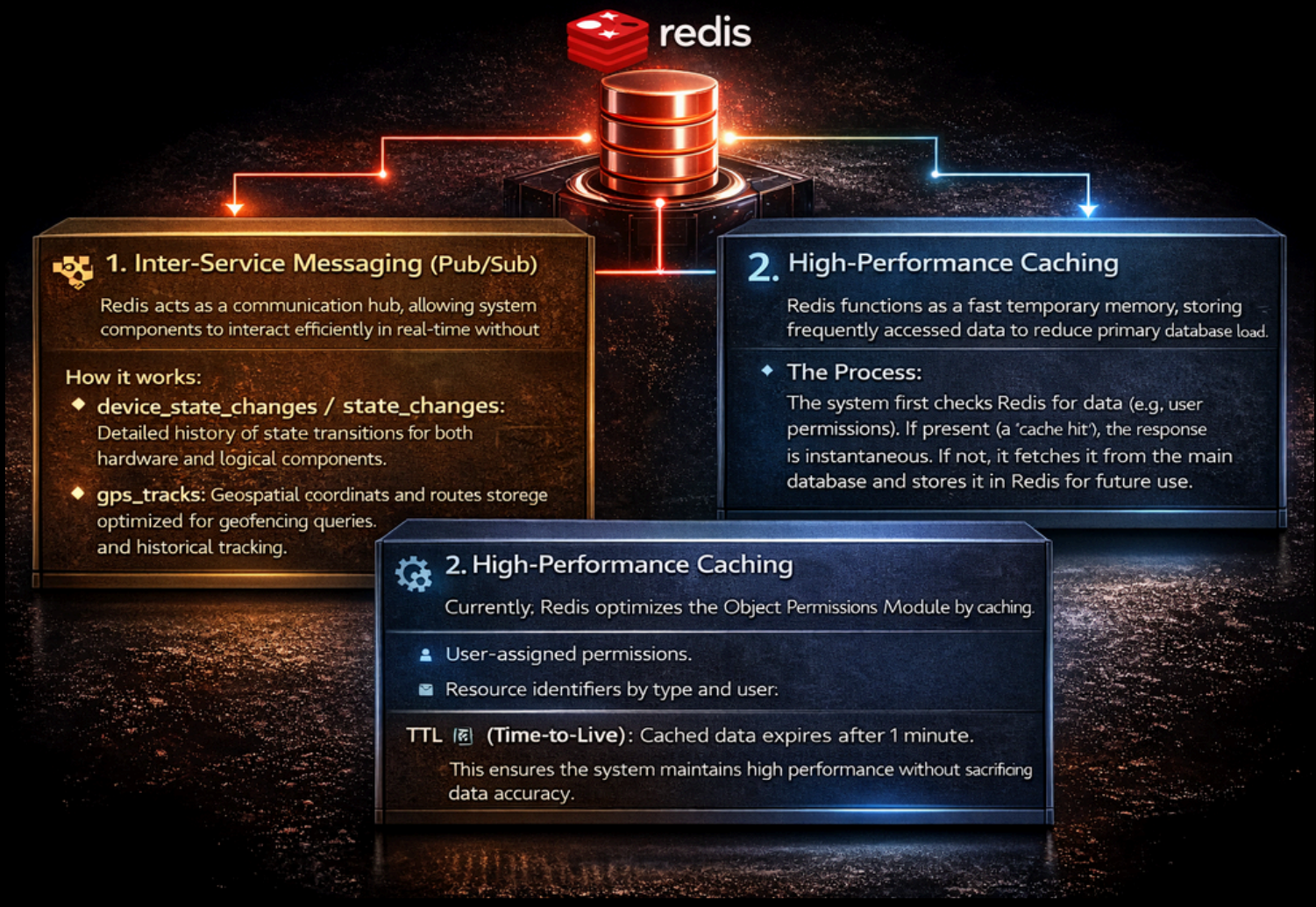

Traefik: Unified API Gateway & Edge Router

Traefik serves as the platform's single entry point, acting as an intelligent traffic director. It intercepts all external requests and routes them to the appropriate internal services while applying centralized security and validation layers.

Keycloak: Identity and Access Management (IAM)

Keycloak serves as the platform's centralized security core, acting as a unified authentication and authorization server. It enables a robust Single Sign-On (SSO) architecture, allowing users to authenticate once to access multiple independent applications seamlessly.

Cutting-Edge Experience Center

Convergence & Automation
Netsocs Synergy 3.0

Where Vision Meets Reality

The next frontier of innovation isn't built in isolation. Welcome to the intersection of human talent and disruptive technology. Let’s co-create the future, together.

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