

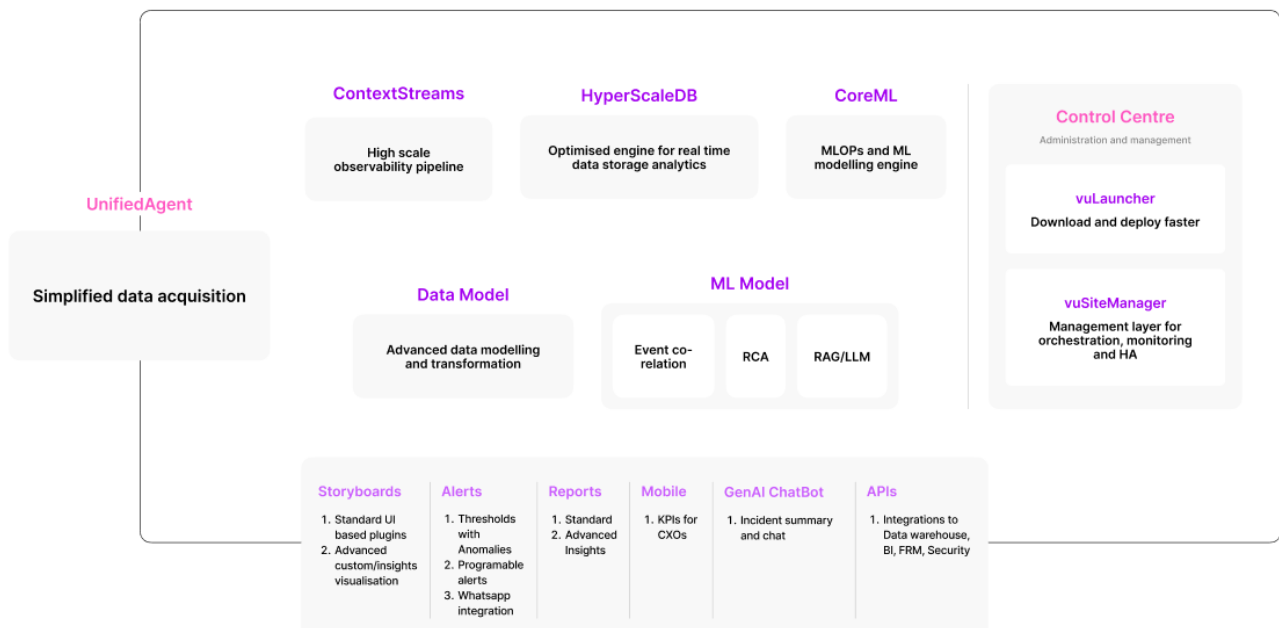


vuSmartMaps™

Application Observability
Functional Features

vuSmartMaps™ – Introduction

vuSmartMaps™ has been built ground up as a highly extensible Big Data /ML based platform that connects user experience, business transactions, infrastructure, and IT operations. The figure below shows the high-level view including the roadmap features:

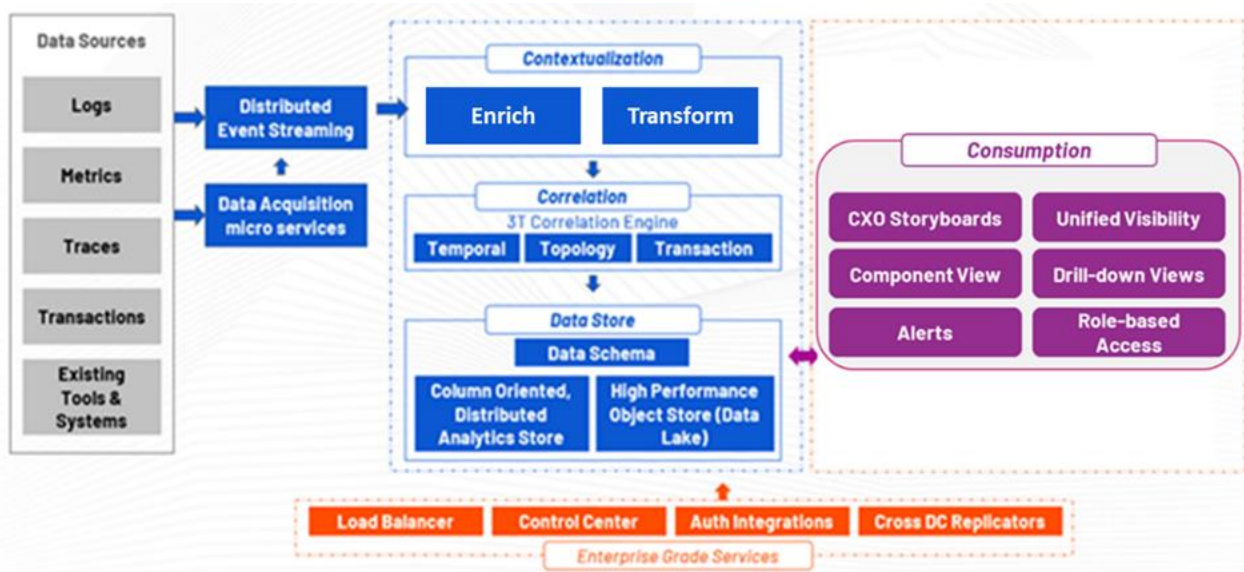


Key capabilities of vuSmartMaps™ for Observability are as follows:

- Observability Pipeline for Ingestion, Handling, Enrichments and Routing** – vuSmartMaps™ can ingest structured and unstructured data, events, metrics, and logs from many different data sources through its ContextStream Data pipeline. It natively supports 400+ data sources. vuSmartMaps™ collects performance data (Golden Signals) from all the touchpoints (Network, Server, Middleware, Application, Database, Storage) in the IT infrastructure. The ingested data is enriched, transformed and through the underlying transaction schema, made available for computation and visualization in the Data Model.
- Hyperscale Data Store** – Data management layer based on composite architecture of columnar database supporting handling of large-scale data efficiently and effectively. Designed to meet the unique real analytics requirements of businesses, this data store framework enables optimized storage and sophisticated real-time data modeling and handling.

- **Data & Machine Learning Operations Layer** - All the ingested data is correlated, transformed, and enriched using vuMVA™ as a Multi-Vector Array. The data is stored in its proprietary Hyperscale data store which is also used to create an operational data lake. This enables creation of various machine learning and data analytics use cases including anomaly detection and user experience & application performance index.
- **Visualization Layer** - Pre-defined and canned storyboards and CXO dashboards that address the needs of executives and operations teams. Ability to customize and craft new storyboards, define role-based access and views.
- **Unified Visibility Across Distributed Deployment** - Platform supports ingestion, processing of data in each instance along with role-based access for users in each country, it also supports a common view across the instances.

Platform Architecture



For unified application observability, VuNet will enable vuApp360 product to bring-in application traces from OTEL, infrastructure metrics and error / exceptions.

Platform Differentiation

The critical considerations of the platform that differentiates the VuNet platform include:

- Highly integrated stack that seamlessly integrates Observability pipeline, Data Modeling layer, Datastore and Visualization for a holistic solution.

- Customizable building blocks to adapt to environment context through adapters, ensuring seamless integration and tailored insights.
- Vendor Agnostic and aligning to industry standards, supporting OpenTelemetry and ensuring ease of use for open-source enthusiasts.

Functional Features

vuSmartMaps™ platform gives the benefit of Unified visibility and correlation of performance across the multi-tier applications which aids faster troubleshooting, identifying performance bottlenecks.

- The unified visibility feature will bring together infrastructure and application performance metrics in a unified dashboard with intuitive visualizations like Service Maps, RED Metrics etc.
- Automated Insights that provide English-like narrative based on analysis of application, and infrastructure behavior.
- Intelligent Alerting feature based on static, dynamic and programmable thresholds deliver instant notification through in-app alert console, text or email.

A detailed listing of features against the product modules and scope is summarized below –

<p>vuSmartMaps™ Core Central Platform</p>	<ul style="list-style-type: none"> • Big Data cluster configuration and central platform – aggregation, correlation and visualization engine • Data pipeline and ingestion capability from diverse data sources, common data schema, data enrichment capabilities and alerting engine. • Integration to ITSM • Role Based Access • Reports
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<p>Infrastructure Monitoring</p>	<ul style="list-style-type: none"> • Health and Performance Monitoring of Servers • Monitoring, Alerting and Analytics of JVM Performance • Health and Performance Monitoring of load balancer • Health and Performance Monitoring of Databases • Near real-time/Live dashboards monitoring, Proactive Notifications based on business rules.
<p>Application Observability</p>	<ul style="list-style-type: none"> • Instrumentation and integration of traces for RED Metrics for all services (Rate, Error, Duration). • Detailed context with method, class and line of code visibility through stack trace. • Detailed error context through stack trace.

The detailed feature listing is provided below:

#	Feature	Description
1	Monitoring and Visibility	
1.1	Unified application observability	Monitors all layers of the application from infrastructure to application code.
1.2	Real-time performance metrics collection and tracking	Collects and analyzes data in real-time to detect degradation and failures. Tracks key performance metrics like request rate, error rate, and latency (duration) with code-level visibility to assess business impact and system health through the association of services to applications.
1.3	Auto-instrumentation of Applications through OpenTelemetry	Seamless instrumentation of traces and telemetry using OpenTelemetry libraries

		without code modifications, enabling easy integration.
1.4	Services Map - Application topology and service dependencies visualization	Provides a map-like view of inter-service connections and dependencies.
1.5	Latency Visualizations	Provides a latency breakdown by hosts, services, and dependencies to identify slow operations
1.6	Service Catalog	Simplifies managing microservices with filters and drill-down options to quickly resolve performance issues. The Service Catalog aggregates health data, offering a high-level view of all services and their status. Users can track the health of individual services using the "Service Summary" and monitor overall application health to identify issues and performance drops.
1.7	Tracking of instrumented services	Ensures all instrumented services are easily tracked, providing a comprehensive view and their current operational status.
1.9	Real-time error tracking	Collects and identifies multiple error types in real-time, providing visibility into errors across different services for quick troubleshooting.
2	Distributed Tracing and Performance Analysis	
2.1	End-to-end transaction tracing	Tracks user requests from entry to response across various microservices and distributed systems.
2.2	Full-fidelity tracing with and without sampling	Captures all transaction data for full visibility.

2.3	Code-level diagnostics	Provides insight into problematic lines of code causing performance issues.
2.4	Inefficient methods and SQL query identification	Pinpoints slow queries or inefficient code.
2.5	Database performance monitoring	Analyzes slow queries and correlate with Trace IDs.
2.6	Hierarchy Breakdown through Trace Graph	A trace graph breaks down the hierarchy of distributed calls by visualizing the parent-child relationships between spans. It provides an overview of the interactions and dependencies between services, helping to identify performance bottlenecks and trace errors.
3	Service Discovery and Mapping	
3.1	Automated service discovery and dependency mapping	Automatically discover and map applications and services. Visualize real-time interactions between different components. Correlate telemetry data for a detailed view of workflows.
3.2	Real-time application topology updates	Dynamically updates the application's topology and service dependencies in real-time when new services are instrumented.
4	Dashboards and Reporting	
4.1	Customizable real-time dashboards	Provides technical and business dashboards for different user roles.
4.2	Automated report generation	Creates and distributes performance reports automatically.
4.3	Flexible querying and data visualization	Supports custom queries and visualizations.

5	Alerting and Notification	
5.1	Multi-channel alerting	Provides alerts via email, SMS, WhatsApp, etc.
5.2	Customizable alert rules	Allows specific alert rules and thresholds.
5.3	Integration with existing alert mechanisms	Compatible with existing alert management systems.
5.4	Out-of-box Alerts	Provides real-time alerts based on various parameters including high request rates and error rates when thresholds are exceeded.