



PRODUCT BUILD | QA | APPLICATION MODERNIZATION

Global Device Management Provider

A leading global technology organization specialising in connected devices approached gravity9 to help address critical scalability and infrastructure challenges. As a key player in the device management space, the company operated a sophisticated platform supporting high volumes of data traffic from users and devices across a distributed global network. With ambitious growth plans, they aimed to double or triple their platform load to accommodate millions more devices. However, they recognised that their current architecture, particularly around

database writes and data ingestion, was reaching its performance ceiling. To sustain their growth trajectory without incurring excessive infrastructure costs, they sought a partner with deep technical knowledge in scalable architectures and hands-on experience with MongoDB. gravity9 were engaged to architect, optimise, and guide the transformation needed to meet this scale, without compromising performance or operational continuity.



Review of Challenges

Despite already supporting a significant number of devices and users, the client faced mounting concerns about the scalability of their platform. The anticipated increase in operational load would push their infrastructure to a critical point, where database writes could become bottlenecks, and system performance would degrade unpredictably. The messaging infrastructure which is central to data ingestion was already showing signs of saturation, requiring over-provisioning of services that threatened to inflate costs by hundreds of thousands of dollars. Compounding the challenge, the technical architecture lacked the flexibility to efficiently consolidate or route telemetry data, resulting in excessive write activity and strain on the backend.

Additionally, the globally distributed nature of the organisation introduced logistical and communication complexities, making collaboration across time zones and regional teams difficult. In this high-stakes environment, delivering change at scale required not only technical precision, but also operational agility and robust coordination

Our Solution

Delivering a scalable solution on a live platform processing thousands of device interactions per second demanded both strategic foresight and tactical expertise. gravity9 conducted a full technical review of the data model and ingestion logic, identifying key inefficiencies in the way telemetry data was handled. One of the most impactful interventions was the consolidation of more than 90 telemetry collections into a streamlined set of time-series collections.

This approach significantly improved data persistence and reduced unnecessary write operations. In parallel, the object model was restructured to accommodate future scale, ensuring that updates were targeted and efficient. We introduced structured batching to the data ingestion pipeline, allowing near real-time updates without overburdening the infrastructure with individual writes. These changes were supported by an upgrade to the latest versions of key platform components, aligning operations with current best practices and ensuring long-term maintainability.

Utilized Technology Stack

Database: MongoDB

Backend: Spring Boot, Java

Message Broker: Apache Pulsar

Our Approach

gravity9's engagement began with a deep dive into the client's existing systems. Our team conducted architectural reviews, on-site workshops, and infrastructure walk throughs to fully understand the data flow, survivorship logic, and system constraints. We grounded our technical strategy in the client's business goals, prioritising enhancements based on complexity, implementation effort, regression risk, and expected performance gains. Our methodology ensured that quick wins could be delivered early, while more intricate transformations were planned and validated methodically. Load testing environments were used to simulate real world usage patterns, giving us the confidence that our changes would perform reliably under pressure. Throughout the process, we maintained close collaboration with the client's internal teams, enabling iterative delivery and ensuring zero downtime deployments across global operations.

Subsequent Outcomes

The results of our work were both measurable and transformative. The system's ability to process data operations increased by 78%, alleviating pressure on backend infrastructure and reducing the risk of service degradation. Infrastructure costs associated with over-provisioning dropped by 74%; a significant saving that freed up resources for further innovation. Upgrading to the latest versions of MongoDB and

dependent libraries modernised the platform and positioned the client well for future feature expansion and vendor support. Most importantly, we enabled these improvements without disrupting ongoing operations. The success of the engagement demonstrated Gravity9's ability to navigate complex data ecosystems and deliver sophisticated, scalable solutions that unlock business growth.

Client Feedback

Being able to improve the infrastructural posture for a highly active system has enabled further inspection into optimizations for other areas of the organization. Some of these potential improvement areas being considered encircle read patterns of the data that is now stored more efficiently in MongoDB. These include better aggregation of real-time reporting data, better alerting of failure conditions, and forecasting when those failure conditions are likely to occur.

Taking this concept a step further, being able to properly categorize and organize device data for various usage patterns enables more thoughtful introspection of what that data represents. gravity9 is exploring the application of its Agentic AI solution to build a foundation of advanced data analytics that can further empower the client business without creating operational obstacles.

gravity9
streamlined over
90 telemetry
collections into
efficient time-
series structures,
unlocking scalable
performance.

**We enabled a 78%
increase in data
operations and cut
infrastructure costs
by 74%**



gravity9