

INDUSTRY LEADING EMBEDDED SOFTWARE SOLUTIONS

ITTIA DB



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QNX RTOS

 BlackBerry®

QNX®

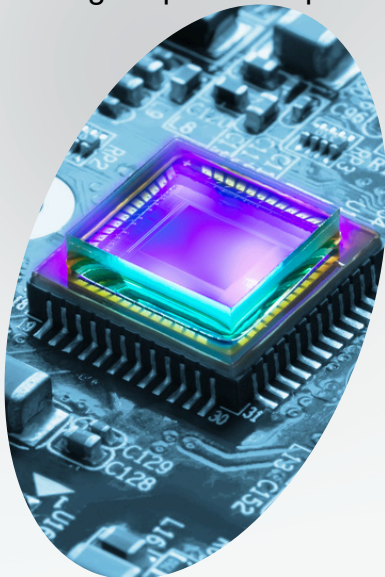
HIGH PERFORMANCE DATA MANAGEMENT SOLUTION FOR BLACKBERRY QNX® RTOS BASED SYSTEMS

EXECUTIVE SUMMARY

In the rapidly evolving landscape of embedded systems, the need for efficient data processing and management on robust operating systems has never been more critical. ITTIA DB and QNX® OS are ideal for embedded real time applications as they both can be scaled to small sizes and provide multitasking, multithreading, and fast time series data management which are essential ingredients of embedded real time systems. Moreover, they both deliver these capabilities for embedded devices with standards and quality.

This whitepaper explores the benefits and synergy between ITTIA DB, an advanced embedded database, and BlackBerry QNX RTOS, a leading real-time operating system (RTOS). We delve into how this powerful combination enables developers to create safe, reliable, and high-performance applications for automotive, robotics, Industrial IoT (IIoT), and related industries. ITTIA DB offers embedded application developers sophisticated data computing empowerment through software tools for processing, filtering, and analyzing data directly within their applications on the edge devices. By enabling applications to locally store only the most relevant data, ITTIA DB optimizes resource usage and facilitates efficient cloud integration. The edge application only needs to upload relevant data to the cloud thereby saving cloud storage and data upload costs. When ITTIA DB real time characteristics are coupled with QNX's deterministic performance and robust security features, developers can leverage a comprehensive platform that accelerates development cycles while maintaining the highest standards of safety and reliability.

This whitepaper also will demonstrate how the integration of ITTIA DB with QNX addresses key challenges in embedded system development, providing a foundation for innovation across multiple industries. From reducing time-to-market to enhancing data management capabilities, we explore the multifaceted benefits of this technological partnership.



EMBEDDED SYSTEMS

Understanding ITTIA DB and BlackBerry QNX

ITTIA DB represents a paradigm shift in embedded data management. Unlike traditional databases, ITTIA DB is specifically designed to meet the unique requirements of embedded systems, on which some resources are constrained. ITTIA has a unique solution that offers embedded systems to process massive volumes of data and only store valuable information. It is architected and designed to monitor, analyze, and store real-time data streams inside the embedded system. It can be considered as a central data management platform for applications on the same device to dynamically query data originating from various sensors and devices inside. With these unique abilities, ITTIA DB empowers each device to control how it will ingest, process, and feed the data to other components, including machine learning and cloud.

By performing these operations at the edge, ITTIA DB reduces the need for extensive data transfer and centralized processing. One of its key features is its ability to selectively store only the most relevant and important data locally, on Cortex-A and Cortex-M processors, optimizing storage usage in systems with limited capacity. While prioritizing local processing, ITTIA DB also facilitates efficient data uploading to cloud services, allowing developers to leverage cloud resources when necessary while minimizing bandwidth usage and associated costs. ITTIA SDL is conformant to the principles of IEC/ISO 62443. There is no other company offering such a solution for embedded data management now.

QNX has long been recognized as a leader in the RTOS market, particularly in safety-critical and high-reliability environments. Its microkernel architecture provides enhanced stability and security by minimizing the amount of code running in kernel mode, isolating critical components and reducing the impact of failures. For real-time systems, QNX offers deterministic behavior, ensuring that time-critical tasks are executed consistently and within specified time constraints. The operating system's adaptive partitioning technology allows for efficient resource allocation among different processes, ensuring that critical tasks always have access to necessary system resources. Furthermore, QNX has achieved numerous safety and security certifications, making it suitable for use in industries with stringent regulatory requirements, such as automotive (ISO 26262) and industrial control systems (IEC 61508).

ROBOTICS & AUTOMATION



THE SYNERGY OF ITTIA DB AND BLACKBERRY QNX

The integration of ITTIA DB with QNX creates a powerful platform for embedded application development. This constructive collaboration manifests in several key areas, enhancing data management in real-time environments, improving resource utilization, ensuring robust safety and reliability, and streamlining the development process. ITTIA DB's efficient real-time data processing capabilities complement QNX's real-time performance, allowing for sophisticated data management without compromising system responsiveness. The combination of ITTIA DB's optimized storage and QNX's efficient resource management ensures that embedded systems can handle complex data operations while maintaining optimal performance. QNX's safety-certified foundation, coupled with ITTIA DB's data integrity features, provides developers with a trustworthy platform for building mission-critical applications. This integration reduces the complexity of managing data in real-time systems, allowing developers to focus on application logic rather than low-level data handling and system management.

MEDICAL DEVICES



BENEFITS AND INDUSTRY APPLICATIONS

Developers leveraging the ITTIA DB-QNX combination can expect several significant advantages. ITTIA's decision to embed a streaming database, a transactional database, and a time-series database into the ITTIA data management platform enables manufacturers of embedded systems to cover variety of use cases. The integrated platform simplifies many aspects of embedded system development, from data management to real-time processing, enabling faster application creation and deployment.

Most businesses rely on their capacity to integrate software, and regrettably, the majority are unable to launch products on schedule. Integrated software will quickly turn into an issue in itself because a reputable provider is unlikely to support the solution. ITTIA and BlackBerry QNX have been partners for several years and their joint solution will offer time and peace of mind for going to market with a solution that is already integrated and supported.

In addition, the ITTIA DB-QNX integration offers compelling solutions across various industries. In the automotive sector, this platform enables the development of advanced driver assistance systems (ADAS), infotainment systems, and vehicle diagnostics applications. The real-time capabilities of QNX, combined with ITTIA DB's efficient data management, support the high-performance, safety-critical nature of modern automotive software.

Robotic systems benefit from the platform's ability to process sensor data in real-time while ensuring deterministic response times, crucial for applications ranging from industrial automation to collaborative robots in manufacturing environments. In Industrial IoT applications, the platform facilitates edge computing scenarios where data can be processed locally, with only relevant information sent to the cloud, reducing latency, improving reliability, and optimizing bandwidth usage in industrial settings. For an industrial system to monitor, process, and store data internally, consistent, accurate data management is essential. The automation capabilities of QNX OS, specialized data management in ITTIA DB and real-time data processing of ITTIA DB provide scalable development solutions for which sensors and devices can communicate data.



AUTOMOTIVE

The safety-critical nature of medical devices aligns well with the robust and certified nature of QNX, while ITTIA DB's data management capabilities support the complex data processing requirements of modern medical equipment. In aerospace and defense applications, where reliability and real-time performance are paramount, the ITTIA DB-QNX platform provides a solid foundation for developing mission-critical systems.

IMPLEMENTATION STRATEGIES AND FUTURE TRENDS

Successfully implementing an application with ITTIA DB and QNX platform requires careful planning and execution. Key strategies include thoroughly assessing application requirements, designing for modularity to leverage QNX's microkernel architecture and understanding ITTIA DB's flexible architecture. Deploying a unified data model enables applications built with ITTIA DB and QNX SDKs to take full advantage of local processing and filtering capabilities with optimized data flows.

As embedded systems continue to evolve, several trends are likely to shape the future of platforms like ITTIA DB and QNX. We can expect to see enhanced AI and machine learning capabilities, enabling smarter edge computing and more sophisticated data analysis. Improved security features will likely be developed to protect against new vulnerabilities in embedded systems. While maintaining a focus on edge processing, future developments may offer even more seamless integration with cloud services for advanced analytics and system management. As new processor architectures emerge, particularly those optimized for AI and IoT applications, the platform will likely expand to support these new hardware capabilities.

CONCLUSION

The integration of ITTIA DB and BlackBerry QNX represents a significant advancement in embedded system development. By combining efficient data management with a robust, real-time operating system, this platform addresses many of the key challenges faced by developers in industries such as automotive, robotics, and Industrial IoT. The benefits of this integration are clear: accelerated development cycles, enhanced application performance, improved data insights, and the ability to create safer, more reliable embedded systems.

HEAVY MACHINERY



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