

Solution Brief

Device Management
Artificial Intelligence



balena

Mastering IoT Deployment and Device Management at the Edge with balenaCloud

The balenaCloud platform offers compatibility with Intel® Processors and makes deployment of the Intel® Distribution of OpenVINO™ toolkit simple in order to pave the way for seamless provisioning and deployment of IoT Linux devices at the edge. Balena helps organizations unlock the full potential of their IoT ecosystems and go to market with ease.

accelerated by **intel**.

About Balena

Balena is a pioneering technology company that specializes in simplifying the deployment and management of connected devices at scale. Known for their user-friendly approach and robust backend support, Balena empowers organizations of all sizes to leverage the full potential of IoT technology, facilitating seamless integration and operational excellence in an increasingly connected world. Balena's commitment to innovation and customer success has made them a trusted partner in the IoT industry.

Navigating the Intricacies of IoT Device Management

In the expanding realm of the Internet of Things (IoT), effectively deploying and managing applications across an array of edge devices presents a significant challenge. Developers often find themselves entangled in a web of complexity as they simultaneously strive to achieve consistent programming across diverse hardware and languages, tackle the nuances of disparate embedded systems, and navigate tools ill-equipped for today's more common development workflows. This not only hinders efficiency but diverts developers' attention from core competencies that drive business progress, resulting in a prolonged time to market and delay on the expected return on investment.

There is an industry-wide struggle to find deployment methods that are both familiar and scalable. Businesses need solutions that don't halt progress by requiring developers to master new programming languages, manage unfamiliar operating systems, or become experts in embedded or cloud development. Amidst this complicated backdrop, balenaCloud emerges as a beacon of innovation, offering a streamlined approach to cut through the maze of IoT application development and device management.

Overcoming Complexity: Transforming IoT Deployment with balenaCloud

Enter balenaCloud—a full-stack, container-based platform designed to demystify and simplify IoT fleet management. This comprehensive solution empowers developers to develop, deploy, and manage IoT edge devices at scale. With balenaCloud, the strenuous task of ensuring compatibility across different devices is a concern of the past.

The solution streamlines device provisioning with a centralized management platform, streamlining the addition, configuration, and deployment of devices through a unified interface regardless of their diversity or complexity. Leveraging container-based technology, developers can deploy granular updates and troubleshoot issues remotely, removing the need for physical intervention.

With a platform that is both powerful and intuitive, Balena enables existing teams to oversee their IoT ecosystem without the steep learning curve that is typically associated with learning embedded systems. Whether a team is familiar with embedded development or not, Balena handles the operating system, the backend infrastructure, and the hardware compatibility layers to support over 100 different models of hardware, all using the same intuitive interface. This frees developers and engineers to focus on critical tasks within their primary roles. In essence, balenaCloud is not just a tool, but a force multiplier for any existing workforce that maximizes the impact of a team's capability by liberating developers to focus on what they do best—innovating and driving the business forward.

Balena: A Partner in IoT Fleet Management

Beyond providing a platform that reduces the technical burden for developers, Balena stands as a strategic partner deeply invested in the success of the fleet growth journey for their customers. No matter where an organization finds themselves within that journey, whether beginning with a handful of devices or scaling to hundreds of thousands, Balena is there to provide unwavering support and expert guidance. As a strategic ally, Balena is not only devoted to equipping users with familiar tools and consistent quality across devices but extends their commitment to helping organizations reach the outcomes they're looking for.

Among the list of Balena's unique capabilities, the following especially set them apart as enabling customers to improve growth outcomes for their business:.

Key Differentiators



Expert Back-End Support: Balena provides exceptional back-end support, offering users access direct access to the engineers who develop their platform. This means users can quickly connect with experts who are ready to tackle their unique challenges, without the typical delays and impersonal experience often associated with standard call centers. With Balena, users can expect swift, personalized assistance tailored to address any specific need.



Scalability: Scalability is at the heart of balenaCloud's design, allowing users to effortlessly expand their IoT fleets from a handful of devices to thousands without compromising on performance or manageability. This scalability is both dynamic and efficient, ensuring that the system adapts to varying demands while maintaining optimal operation.



Device Compatibility: The platform's broad device compatibility offers a significant advantage to users in the IoT space. Regardless of hardware variety within an IoT fleet, balenaCloud can integrate and function efficiently across 100 plus device models. This versatility simplifies IoT ecosystem management and allows users to scale operations without hardware constraints.



Consistent Updates Across Hardware Devices: balenaCloud requires hardware-in-the-loop testing for every supported model to ensure that all new balenaOS releases are tested on the actual physical hardware before being pushed to balenaCloud. This suite rigorously tests each device, guaranteeing that the OS runs smoothly and reliably, and reducing the risk of hardware-specific failures or inconsistencies with new OS updates.



Familiar Tools and Interfaces: The platform's integration with familiar tools and interfaces, including seamless CI/CD pipeline compatibility, means that developers can utilize their existing skills and workflows and build applications in the language and distribution of their choice. This familiarity reduces the learning curve and accelerates development cycles, making the platform accessible and efficient for all levels of users.



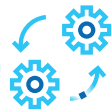
Container-Based Architecture: Utilizing a read-only operating system built on container technology, balenaCloud offers a robust and isolated environment for each application, enhancing security and portability. Containers ensure that applications are lightweight, easy to deploy, and consistent across different environments, thereby streamlining the development and deployment process.



Accelerate ROI and expedite time to market for initial deployments and future growth by utilizing familiar tools that streamline IoT development and remove obstacles that delay device deployment.



Save time and money by leveraging Balena's infrastructure and embedded development expertise. Companies can alleviate costs and time associated with training and maintaining a highly specialized in-house embedded development team.



Optimize operational efficiency through simplified IoT fleet management. Remotely deploy new initiatives and expand on existing ones with less technical overhead and greater confidence in the reliability and security of any IoT ecosystem, regardless of hardware disparity.

Balena in Action: How balenaCloud Overcomes Customer Challenges

Industrial IoT: Solutions being deployed in manufacturing facilities or other industrial locations require a strong focus on DevOps to ensure smooth rollouts and avoid costly, or sometimes dangerous, failures. For situations like these, where updates can be critical and collaboration is key, prominent global technology suppliers use balenaCloud.



Our services are developed in an agile, iterative approach, based on our customer's feedback. We have to be able to deploy new features and updates to our installed base continuously and we embrace the idea of DevOps throughout our solution architecture. Balena integrates perfectly into that approach."

— Software Engineer at a leading global technology supplier



Signage / Retail: Retail experiences, and especially signage, are often especially sensitive to security concerns - what is meant to be displayed is the only thing that should be displayed, and attacks to other parts of the network shouldn't begin at a signage endpoint. For this reason, in-location experience companies use Balena to ensure the latest security updates are applied and infrastructure remains protected and managed in a reliable way.



One of the most valuable aspects of Balena is keeping up with OS-level security updates and managing devices in the field. Balena is really buying peace of mind, similar to the value prop that AWS offers. We see Balena as critical infrastructure."

— Director of Engineering at a prominent in-location experience company



Balena and Intel®: A Strategic Collaboration

The collaboration between Balena and Intel has been pivotal in optimizing and capitalizing on the widespread familiarity of Intel technology. One of the core hardware types supported by balenaCloud is Intel's X86 architecture, known for its high-computational performance, complimenting Balena's commitment to simplicity and helping users accelerate their time to market. Intel® Core™ processors are an accessible and cost-effective entry point for edge inferencing, ideal for those embarking on AI and inferencing projects. These processors strike an ideal balance between price, power, and performance, providing a cost-effective yet powerful solution for edge computing needs.



The containerized Intel® Distribution of OpenVINO™ toolkit further simplifies the deployment process. With Balena, deploying OpenVINO™ is as simple as adding an app, allowing users to quickly set up and run AI applications on their devices, without extensive upfront work or deep expertise in specialized hardware. With over 200 pre-trained models ready to address a multitude of industry needs, users can select the function that meets their needs and quickly get started with their application.

The combination of OpenVINO™ and Intel® hardware maximizes the performance of users' models, enhancing both resource efficiency and processing speed. With balenaCloud, users can easily access this hardware: simply add a fleet, choose the desired hardware from a dropdown menu, and deploy the application in 5 minutes or less. This streamlined process offers a straightforward, user-friendly experience for optimal hardware utilization.

Many organizations can leverage their existing CPU infrastructure, easing the transition to Intel's Core™ Processors for edge computing. The Balena-Intel partnership offers a perfect blend of advanced technology and accessibility, enabling users to efficiently harness AI capabilities and embark on their IoT endeavors with confidence and ease.



The Simplicity of Getting Started with Balena

Balena makes getting started nearly effortless. Customers can begin their journey by signing up and adding up to ten devices free of charge. The platform is designed for ease of use, allowing users to select their hardware, install applications, and manage deployments, all through an intuitive interface.

Balena's commitment to user experience extends throughout the deployment process and beyond, offering support for any technical bottlenecks, scaling needs, or scaling expertise. Additionally, the team helps with optimizing over-the-air updates in challenging network environments and assists with automating updates using APIs and SDKs for scalability. All these features come together to make sure that starting and scaling with Balena is a smooth, user-friendly experience.

Conclusion

balenaCloud stands at the forefront of IoT fleet management solutions, encapsulating a future where developers are free to innovate without the constraints of infrastructure management or specialized embedded knowledge. By reducing complexity and fostering familiarity, balenaCloud not only simplifies IoT deployment but accelerates the journey from a concept to a market-ready product. With its streamlined approach for device provisioning and management, balenaCloud's user-friendly, centralized platform facilitates the effortless integration, configuration, and deployment of diverse IoT devices. Its ability to simplify intricate processes and accommodate a wide range of devices makes it an invaluable tool for any organization looking to optimize their IoT operations.

[Sign up here](#) to get started with balenaCloud today and try up to 10 devices for free!



To learn more about the balenaCloud Solution visit:

- [Balena Website](#)
- [balenaCloud Product Page](#)
- [Balena Intel® Distribution of OpenVINO™ toolkit App Blog Post](#)

To learn about Intel® technologies visit:

- [Intel® DevCloud Product Page](#)



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By taking advantage of acceleration technologies, such as Intel® Advanced Vector Extensions 512 (Intel® AVX-512), Intel® Advanced Matrix Extensions (Intel® AMX), and others, our optimized solution helps accelerate time to innovation and insight.

With Intel technologies and capabilities, a vendor's optimized offering can go beyond the traditional compute and extend to accelerated networking, storage, edge, and cloud. It's all part of helping customers build an optimized infrastructure across the company.

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