

# Bosch migrates its production planning system to a highly resilient and efficient application platform



## Industry

Manufacturing

## Headquarters

Gerlingen, Germany

## Size

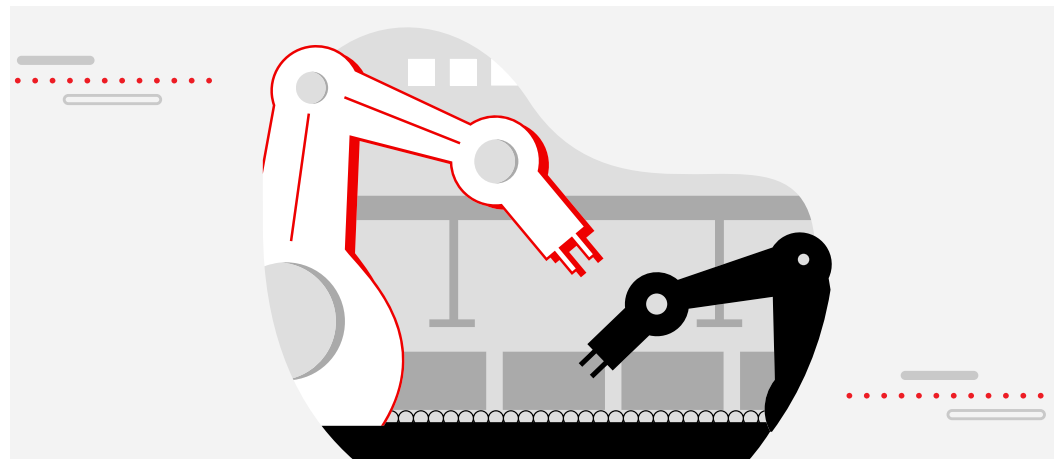
427,600 associates  
240 plants

*"Our Red Hat technology gives us a lot of confidence and saves a lot of effort at critical times."*

## Richard Pohl

Lead ProCon Architect, Bosch

Bosch is a leading global supplier of technology and services headquartered in Germany. The company took on the transformative journey of migrating its ProCon production planning solution used by 90 plants to the Bosch Private Cloud (BPC), powered by Red Hat technology. Highlighting the collaboration with Red Hat, the story unfolds the challenges and innovative solutions that marked this year-long migration. Key outcomes include enhanced operational efficiency, significant improvements in scalability and resilience, and the adoption of industry-standard best practices. Through meticulous planning and a smart execution of the migration project, Bosch achieved a seamless transition ahead of schedule and set a new benchmark for cloud-based industrial applications.



## Software and services

Red Hat® OpenShift®  
Red Hat OpenStack® Platform  
Red Hat Consulting

## Benefits

- ▶ Enhanced resilience, with automation ensuring recovery in 30 minutes
- ▶ Cut patch rollout times from 50 hours to 1.5 hours with near-zero downtime
- ▶ Gained a wealth of convenient tools and features
- ▶ Improved operability through an optimized GitOps approach

## About Red Hat Innovators in the Open

Innovation is the core of open source. Red Hat customers use open source technologies to change not only their own organizations, but also entire industries and markets. Red Hat Innovators in the Open proudly showcases how our customers use enterprise open source solutions to solve their toughest business challenges. Want to share your story? [Learn more.](#)

*“Red Hat Consulting provides real value for money.”*

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**Joerg Kairies**

Senior System Engineer  
Operations, Bosch

## **Elevating Bosch’s Industry 4.0 vision: The ProCon cloud migration experience**

Bosch is known as a pioneer in innovation and technology and as a global leader in a wide range of sectors: Mobility, Industrial Technology, Consumer Goods, and Energy and Building Technology. At the heart of its digital transformation in the factory is ProCon – an internally developed modular production planning solution that exemplifies Bosch’s forward-thinking approach to Industry 4.0.

ProCon bridges the gap between high-level planning in ERP systems such as SAP and real-time operations on the shop floor. The ProCon way to streamline the production planning process is through integration with SAP and Manufacturing Execution Systems (MES). This enables real-time monitoring and adjustment of production plans, as well as automated replenishment, eliminating inefficiencies and allowing Bosch to leapfrog traditional methods such as manual Kanban systems. “ProCon is currently used as the production planning solution for more than 1,100 production lines,” said Richard Pohl, Lead ProCon Architect at Bosch.

More than 90 of Bosch’s 240 manufacturing plants worldwide rely on ProCon, embodying the essence of Bosch’s Industry 4.0 strategy. “The Fourth Industrial Revolution is bringing digitalization and automation to the entire value chain,” said Joerg Kairies, Senior System Engineer at Bosch.

Prior to 2023, Bosch’s ProCon applications ran on Docker Swarm clusters in regional data centers. While this setup was functional, it presented operational challenges. The migration to BPC was designed to take advantage of Kubernetes for higher availability, scalability, performance, and operability. As a result, Bosch undertook a migration project that focused on economic feasibility and a strict timeline.

### **Adopting a highly automated application platform**

The goal of the migration was to move ProCon to the Bosch Private Cloud (BPC), leveraging the robust capabilities of Kubernetes OpenShift. Powered by Red Hat OpenShift and running on the Red Hat OpenStack platform, BPC provides a scalable, manageable cloud environment. The synergy between Bosch’s visionary goals and Red Hat’s cutting-edge technology was instrumental in the seamless transition to a more dynamic and scalable cloud ecosystem.

Over the course of a year, the migration took place in two 6-month phases: an initial planning and development phase, followed by an operational migration. “It was easy to adapt Red Hat OpenShift for our use cases. We were able to get the first clusters up and running very quickly, and we were able to run ProCon applications on them,” said Pohl. All 93 plant installations were migrated in a little more than 5 months, clearly ahead of the original tight schedule.

Remarkably, the ProCon team continued to roll out 5 new plants and introduce new features during the migration. Forming a dedicated migration project team was critical to ensuring that development and migration activities ran in parallel. This dedicated team was set up cross-functionally as a DevOps team - with expert Dev and Ops engineers.

Bosch engaged Red Hat Consulting to help with the design of the architecture, system configuration, and ProCon migration. This significantly employed best practices, particularly in optimizing the GitOps approach and templates for a quick and seamless migration.

“The Red Hat experts helped us with GitOps helm charts and templates,” said Iliyan Iliev, Senior Software Architect at Bosch. “They helped us design the templates so we could quickly ‘lift and shift’ the containers from Docker into Red Hat OpenShift while ensuring a consistent deployment. The help from Red Hat Consulting was crucial to our success.”

This insight underscores the critical role of Red Hat’s support in navigating the technical intricacies of the migration. The Red Hat experts also ran and recorded a GitOps workshop, which the teams still turn to today. “Red Hat Consulting provides real value for money,” said Kairies.

The colossal migration required meticulous planning and a thorough understanding of cloud-native application architecture. The team demonstrated remarkable adaptability and creativity in overcoming challenges. For example, the migration of hundreds of MySQL databases was initially approached by temporarily retaining the databases on Docker Swarm to streamline the transition and meet the project timeline. Another pivotal challenge was transitioning the service discovery mechanism, which ensures seamless communication between different parts of ProCon’s cloud-based system. Moving from Consul to Kubernetes services, the team significantly boosting scalability and resilience for zero-downtime deployments. Ingeniously, without modifying ProCon’s existing codebase, a Bosch engineer’s innovative strategy used Kubernetes services for seamless service discovery.

### **Realizing the benefits: post-migration achievements**

#### **Enhanced resilience, with automation ensuring recovery in 30 minutes**

The migration success story is not just about overcoming technical hurdles, but tangible post-transition benefits. Improved resilience was a key result.

“In the event of an incident, ProCon can recover within half an hour. Our operations team doesn’t have to do anything because the recovery is completely automated. Red Hat technology gives us a lot of confidence and saves us a lot of effort during critical times,” said Pohl.

#### **Cut patch rollout times from 50 hours to 1.5 hours with near-zero downtime**

The migration significantly streamlined application rollout processes, reducing patch deployment times from 50 hours to about 1.5 hours, moving the company closer to zero downtime. This increase in efficiency minimizes disruption to the plants.

Looking ahead, Bosch plans to extend these zero downtime procedures to major version upgrades of ProCon.

#### **Gained a wealth of convenient tools and features**

Red Hat OpenShift offers a wealth of convenient tools and features that support the ProCon operations and development teams. With the migration complete, Red Hat OpenShift continues to support the ProCon developers by providing statistics, metrics, and more.

“The Red Hat OpenShift user interface (UI) is really intuitive; we use it extensively,” said Iliev. “It even allows us to open terminals to the ports and browse through them to look at the network egress and ingress rules. It’s very helpful.”

What’s more, Bosch has seen improved operability through an optimized GitOps approach.

## Envisioning a future with BPC

The migration of ProCon to the Bosch Private Cloud (BPC) demonstrates a harmonious blend of technical prowess and strategic foresight. It has improved the applications' resilience and streamlined application rollouts. This paves the way for zero downtime and a swift response to the evolving demands of production plant operations. And the introduction of features such as automatic scaling and GitOps for versioning application configurations significantly improves ProCon's scalability and operability.

Having successfully migrated ProCon to Red Hat OpenShift, the team is now focused on building on its achievements. "The migration to BPC is a significant step toward standardized, efficient and scalable cloud services," said Pohl, emphasizing the move away from the current self-hosting approach to standardized infrastructure services. Other planned enhancements include the introduction of more automation to accelerate major release deployments and the full adoption of GitOps practices across all development teams, streamlining processes and fostering a culture of continuous innovation and efficiency.

The migration to BPC exemplifies the benefits and complexities of cloud adoption in industry, highlighting Bosch's innovation-led approach and the strategic advantage gained through Red Hat's cloud solutions. The nuanced approach to overcoming technical challenges, coupled with the strategic vision that guided the migration, sets an inspiring precedent for the digital transformation of industrial operations.

## About Robert Bosch GmbH (Bosch)

[Bosch](#) is a German multinational engineering and technology company headquartered in Gerlingen, Germany. The company was founded by Robert Bosch in Stuttgart in 1886. It employs roughly 421,000 associates worldwide (as of December 31, 2022). The company generated sales of 88.2 billion euros in 2022. Its operations are divided into four business sectors: Mobility, Industrial Technology, Consumer Goods, and Energy and Building Technology.



### About Red Hat

Red Hat is the world's leading provider of enterprise open source software solutions, using a community-powered approach to deliver reliable and high-performing Linux, hybrid cloud, container, and Kubernetes technologies. Red Hat helps customers develop cloud-native applications, integrate existing and new IT applications, and automate and manage complex environments. [A trusted adviser to the Fortune 500](#), Red Hat provides [award-winning](#) support, training, and consulting services that bring the benefits of open innovation to any industry. Red Hat is a connective hub in a global network of enterprises, partners, and communities, helping organizations grow, transform, and prepare for the digital future.

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#### North America

1 888 REDHAT1  
www.redhat.com

#### Europe, Middle East, and Africa

00800 7334 2835  
europe@redhat.com

#### Asia Pacific

+65 6490 4200  
apac@redhat.com

#### Latin America

+54 11 4329 7300  
info-latam@redhat.com

**f** facebook.com/redhatinc  
**X** twitter.com/RedHat  
**in** linkedin.com/company/red-hat