



80%
reduction in
migration time

80%
reduction in
upgrade time

75%
reduction in
management time

Continental AG

Industry and Location
Manufacturing | Germany

Product(s) and Service(s)
Kubernetes

Pioneering the Evolution of
Manufacturing with Kubernetes

Success Story

At-a-Glance

The three main objectives driving Continental's technology strategy are creating efficiency, maintaining the highest quality standards and achieving this in a systematic and networked manner. It is this strategy that helps Continental transform novel ideas into mass production faster and that led them to partnering with Rancher to achieve these outcomes.

Introducing Continental AG

Headquartered in the German city of Hannover, Continental has grown significantly during the last 150 years to become a global brand. The technology company is now present in 59 countries and markets and has more than 232,000 employees around the globe.

Continental's manufacturing infrastructure team exists to capitalize on the most disruptive technologies, to serve application teams better and drive innovation. With 12 years' experience working as their Manufacturing Infrastructure Team Lead, Roland Paxián took a long-term and global view of technology innovation. Three main objectives drive Continental's strategy – creating efficiency, maintaining the highest quality standards and achieving this in a systematic and networked manner. Paxián and the manufacturing team believe it is this strategy that helps Continental transform novel ideas into mass production faster.

The Journey to Containers

Continental has always been a forward-thinking organization and, naturally, digital transformation and modernization are major preoccupations. In manufacturing, however, the practical implications of modernizing legacy infrastructure, and all the software that runs within it, cannot be underestimated. Continental ran a virtualized infrastructure for many years, which suited them well. But, over time, management and maintenance became problematic. If teams wanted to implement a new feature or upgrade an application, this was time and resource intensive.

When containers emerged six years ago, the team saw an opportunity to streamline infrastructure management and started to investigate. It took a few years for a serious discussion to begin around the value of containerization, but once it did, it wasn't long before the team identified Kubernetes as the most flexible way to get the containerization strategy off the ground.

"Manufacturing processes are under scrutiny as companies seek to gain market share through digital transformation. The process of modernizing machinery in harmony with operational software is not a simple one. Adopting a microservices-based containerization strategy removes some of the complexity."

Roland Paxián
Manufacturing Infrastructure Team Lead
Continental

In 2018, plans started to crystallize. At that time, the primary consideration was whether to move applications to the cloud or remain in the data center. Without doubt, running Kubernetes in the cloud would be relatively simple; it was easy to spin up clusters in AWS and Azure. However, it be-

came clear that latency would be an issue where some critical applications were concerned. Factory machinery requires millisecond response times; therefore, some systems would need to remain in the data center. As such, the team needed a hybrid cloud and on-premise methodology.

If the team wanted to use Kubernetes on-premise as well as in the cloud, they would need to engineer and support their solution – something that would have taken time. Kubernetes offered the right container orchestration methodology, but Paxián and Continental's manufacturing teams needed a way to run multiple clouds and on-premise deployments side-by-side in one platform – that's where Rancher came in.

After a short PoC in 2019, which saw the team evaluate several Kubernetes management options, Rancher emerged as the most suitable platform to help modernize and unify Continental's legion of manufacturing applications. Since Rancher was formally selected in late 2019, growing demand has come from Continental's many manufacturing teams. Paxián's focus is shifting to make the platform available to hundreds of application development teams across the world safely.

"Transforming large manufacturing organizations like Continental is a huge technical and philosophical challenge. The emphasis is on finding the most intuitive and efficient way to modernize while maintaining competitive advantage. Kubernetes and Rancher will help us achieve this."

Roland Paxián
Manufacturing Infrastructure Team Lead
Continental

What were the challenges Continental wanted to overcome?

Legacy Transformation

The primary driver for adopting a cloud-native, container-centric strategy was a need to transform Continental's manufacturing infrastructure into an agile, cloud-native and platform-based architecture. It had to be heterogeneous – flexible enough to run on-premise and cloud workloads together with any vendor, via a central UI.

For Continental's application developers, the change couldn't come soon enough. Application deployment and maintenance had become resource intensive over the years. Everything was handled manually, from design, to build, to deployment and management – and this rigorous process repeated for each new development. The infrastructure team would encounter a host of problems if they needed to implement a new feature or simply upgrade an application. If an application developer needed an environment to develop something new, it would take time to fulfill the request, which slowed the pace of innovation.

Importantly, many production lines run 24 hours a day, seven days a week. If an application or infrastructure component needed to be upgraded or an issue resolved, taking it out of service would cost the company dearly. The team needed an environment that allowed them to develop and maintain manufacturing applications without affecting productivity.

“A major driver for working with Rancher is to create an agile application framework for manufacturing that allows us to keep pace with technological developments. By creating a cloud-native architecture, we’re eradicating old-fashioned practices to make us more innovative.”

Roland Paxián
Manufacturing Infrastructure Team Lead
Continental

Managing this Kubernetes-based infrastructure platform in Rancher, the project team has created a highly agile and scalable application framework, which has removed complexity and significantly reduced management overheads. The new containerized architecture allows them to run applications in separate clusters, with development, test and production environments already in place. If they need a place to spin up new containers to try out new ideas, they can create them in minutes.

If an application needs to be updated, a feature added or maintenance performed, this can be done using Rancher without halting production lines. The team no longer requires costly maintenance downtime during upgrade periods. Updates are centralized and installed in a couple of clicks, which has reduced the management burden and improved overall productivity. The team at Continental estimates management time has been reduced by 75 percent. Because the platform promotes a cloud-native approach to building and deploying new services, applications can be created as microservices. This makes them highly portable between on-premise and cloud

environments, which makes resource allocation and scaling more predictable.

Creating a Global Infrastructure Platform

Now that Paxián and his team have developed the infrastructure platform, their focus is now on rolling out the service to hundreds of teams of developers in 45 locations worldwide. The project has progressed rapidly, and now developers can access the new containerized platform via a single pane of glass.

Of course, some applications are engineered for the cloud, some to reside on-premise, closer to production lines. Running in Rancher, the new infrastructure platform provides a consistent framework for application development while allowing teams to configure and secure them for specific conditions. It then allows teams to deploy to any environment and run these clusters side-by-side via the Rancher UI.

This has major benefits for distributed teams. Having a flexible approach allows teams to develop applications not only with the manufacturing use case clearly in mind, but also in compliance with local regulations. Teams can choose, for example,

to use data centers in highly regulated regions or where processing must take place within the production lines themselves.

“The platform allows us to be truly aligned as a global team within a single methodology. This unification does not only drive consistency and quality, it bonds us together as one team. We hope the groundwork we put in place will form a blueprint for the evolution of other parts of the business.”

Roland Paxián
Manufacturing Infrastructure Team Lead
Continental

In just six months, the team has rolled out the platform to three regions and nine manufacturing locations in Europe and Asia. Paxián’s plan is to launch in 45 more before the end of the year. Paxián believes this is critical for an organization like Continental with a global workforce. For the first time, teams that may be separated both by geography and business unit can work together in a unified and consistent way. More importantly, they can do it safely, within a rules-based domain. By adopting a platform approach to infrastructure management, Continental has created a scalable, agile framework where collaboration and co-operation can reign. This would have been impossible before.

The impact of Continental’s strategy has been marked. By working together under a common methodology, projects are completed faster, and developments are consistent and created according to defined rules. The platform is accessible 24 hours a day, seven days a week, with access tightly monitored in Rancher.

Long-Term Cost Reductions

In manufacturing, it’s common to find large and resource-intensive servers running next to shop floors. Designed for use with specific machinery, these are expensive to run and environmentally outdated. In the long term, by engineering manufacturing applications to be more cloud-native, the infrastructure team will be able to reduce these costs by moving applications to the cloud and the data center.

Where compute resources are still needed in production lines, IoT solutions like K3s will allow the team to run lightweight versions of Kubernetes directly on machinery. While hardware transformation always takes time, Paxián believes by putting the right infrastructure in place now, the path to wider transformation will be smoother.

“The groundwork has been done and, in the process, we have stripped away a multitude of inefficient processes. Not only has this already transformed our working lives, but Kubernetes is also guiding the way toward true operational change in manufacturing.”

Roland Paxián
Manufacturing Infrastructure Team Lead
Continental

Timeline

- 2016: Continental first became aware of containers
- 2018: container strategy crystallizes; Kubernetes selected
- 2019: Started experimenting with Rancher and formal PoC takes place
- Jan 2020: Rancher selected
- March 2020: Deployment begins

Benefits

- 80% reduction in migration time when comparing methodologies
- 80% reduction in upgrade time; from days to hours
- Cost reductions – removing on-site server applications to the data center/cloud
- Central, global management platform for 45 regions and hundreds of developers

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SUSE
Maxfeldstrasse
90409 Nuremberg
www.suse.com

For more information, contact SUSE at:
+1 800 796 3700 (U.S./Canada)
+49 (0)911-740 53-0 (Worldwide)

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