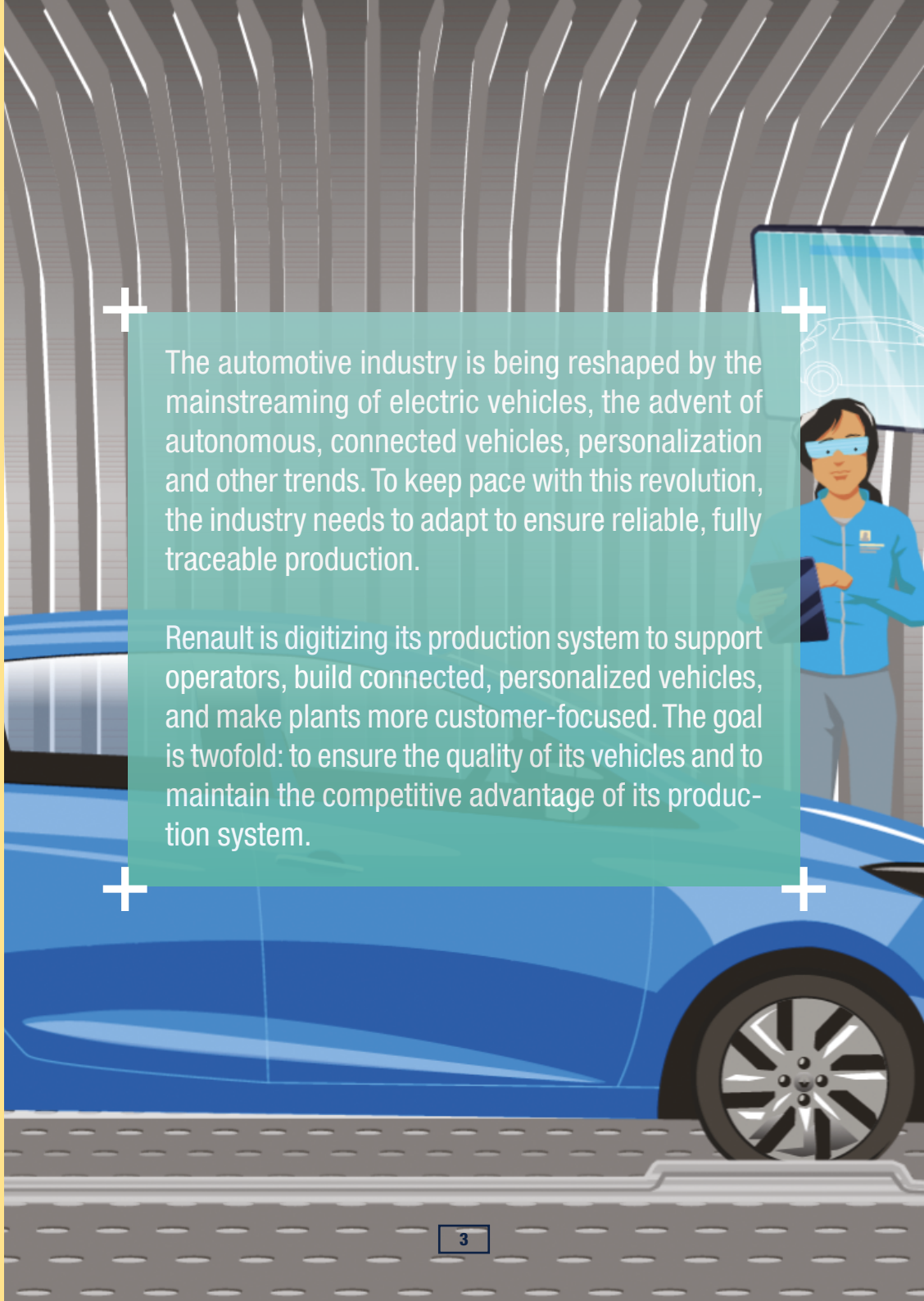
The future is here now at **Renault** plants

GROUPE RENAULT

SETTING ITS SIGHTS ON THE FUTURE, RENAULT IS ADAPTING ITS PRODUCTION SYSTEM TO ADDRESS THE NEW CHALLENGES FACING THE AUTOMOTIVE INDUSTRY.

PEOPLE ARE AT THE HEART OF RENAULT'S PLANT OF THE FUTURE, FROM OPERATORS TO CUSTOMERS.

THE INDUSTRY 4.0 REVOLUTION IS DRIVING CONNECTED, AGILE AND COMPETITIVE MANUFACTURING.



The automotive industry is being reshaped by the mainstreaming of electric vehicles, the advent of autonomous, connected vehicles, personalization and other trends. To keep pace with this revolution, the industry needs to adapt to ensure reliable, fully traceable production.

Renault is digitizing its production system to support operators, build connected, personalized vehicles, and make plants more customer-focused. The goal is twofold: to ensure the quality of its vehicles and to maintain the competitive advantage of its production system.

Renault's plant of the future, focused on customers

CUSTOMERS TODAY ARE LOOKING FOR CONNECTED VEHICLES THAT REFLECT WHO THEY ARE. RENAULT'S PRODUCTION SYSTEM IS ADAPTING TO NEEDS TO ROLL OUT VEHICLES THAT ARE 100% PERSONALIZED. EACH VEHICLE IS UNIQUE.

THE TRACEABILITY OF EACH PART

Each part is traceable, making it possible to track each order every step of the way. As soon as a customer orders a new vehicle, the raw materials are prepared, the suppliers informed and the logistics flows put in place. By fully synchronizing all stages of production, the plant is able to respect lead times, from suppliers to end customers.

Sites use **QR codes** and **RFID tags** for parts, along with a database, to manage the quality of each part throughout the process.

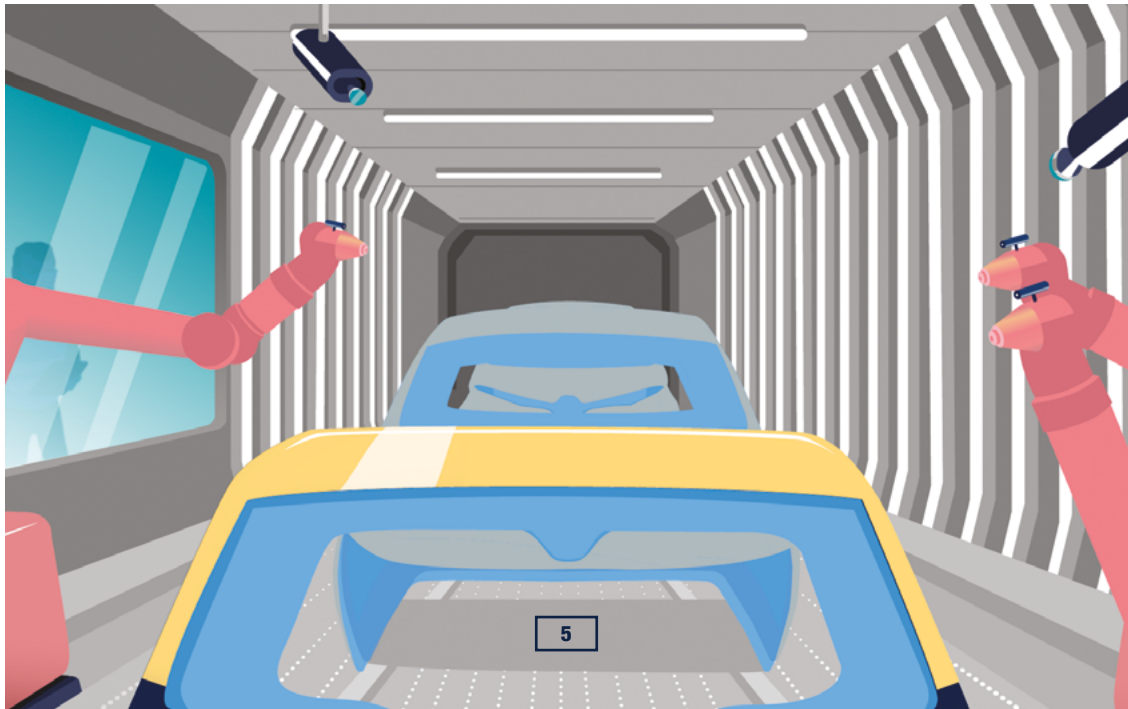
For example

The Valladolid plant (Spain) uses active RFID tags to geolocate vehicles. That enables real-time identification of vehicles ready to be delivered, allowing customers be notified when their vehicles are ready.

A CONTROLLED PROCES

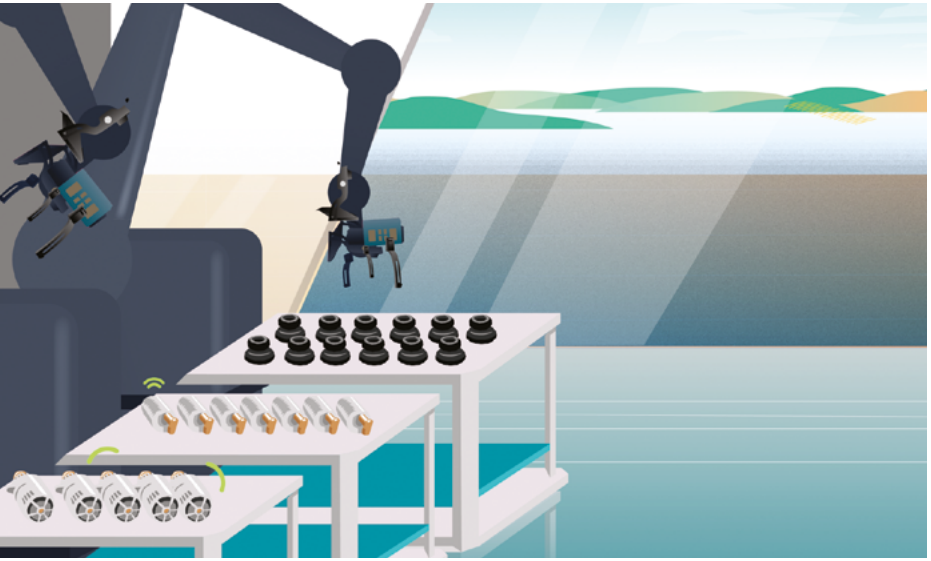
With the **"right first time"** approach, operators treat each vehicle built as if it were their own. They know that everything they do impacts the quality of the vehicle delivered and are also aware of customer requirements.

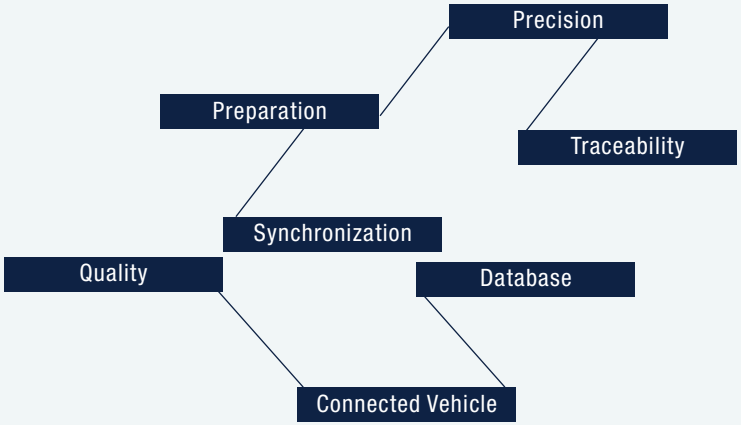
To help them, team leaders organize frontline events and set up demonstration areas in the shop. **This quality-conscious approach builds the awareness of operators**, who play a direct role in customer satisfaction.



Last, **lean manufacturing** emphasizes creating value added for customers. Anything that slows production down needlessly is eliminated. Logistics flows are automated to ensure **smoother parts flow and reassure operators**.

Full kitting is widely deployed, doing away with lineside stock. Operators no longer need to move from point to point: all the parts corresponding to the assembly film are **prepared ahead** of time and follow the vehicle along the assembly line.





*With 36 production sites and 12 logistics sites worldwide, Renault and Nissan manufacturing teams apply the **Alliance Production Way (APW)** production standards.*

Introduced in 2014, this system shares the best practices of both makers, captures synergies and facilitates the deployment of innovations and sharing of investments to upgrade plants.

APW has enabled cross-manufacturing between the two partners. The Micra built at the Flins plant in France is one example.

People are the cornerstones of Renault's plant of the future

PEOPLE LEAD INDUSTRY 4.0.
NEW EQUIPMENT MEANS PEOPLE ARE MORE AGILE, MORE RESPONSIVE AND TRAINED IN NEW TECHNOLOGIES.

Renault has deployed **health**, **safety** and **environment policies** at all its plants and is **attentive to employee well-being** at work.

At the Cléon factory in France, for example, some employees wear **exoskeletons** for easier handling of parts weighing up to 15 kilograms, enhancing their agility and minimizing the risk of injury.

Debulking robots also make it easier to handle parts. They pick up, replace and empty parts into trays, for a more seamless process flow. While a long way from replacing people, technology is gradually helping to phase out the hardest tasks.

Autonomous equipment such as collaborative robots, automated guided vehicles (AGVs) and **driverless forklifts** are bringing to life tomorrow's perfectly ordered plants.

"Success is built on advancements in technology and tools and most of all on the people who develop and use them."

– Jose Vicente de los Mozos –

Last, to support this high-tech revolution, managers are updating the way they work through the **Trust Management process**, which empowers employees and encourages them to demonstrate initiative. It also facilitates teamwork.

Managers embed a climate of trust making people feel free to "**tell it like it is" constructively**. Anyone can ask for help when they encounter a problem in their work, without having to worry about being criticized. Management's job is to **be close to employees to help them develop their skills.**

A training offering has been developed for managers and team leadership standards have been introduced, including regular meetings. These standards make it easier to resolve issues as soon as they arise.

This training has already been provided at most production sites, with the aim of reaching all managers, from team managers to executives, by end-2017.

As a result of this management practice, the Cléon plant in France has seen **a sharp improvement in indicators related to absenteeism, safety and employee engagement.**

The plant of the future is connected

DIGITIZING PLANTS FACILITATES PRODUCTION BY CONNECTING PEOPLE, PRODUCTS AND PROCESSES FROM ORDERS TO DELIVERY. IT IS INTENDED TO ACCELERATE RENAULT PLANTS' PROGRESS AND PERFORMANCE.

THE DIGITAL TRANSFORMATION

It supports and connects management at all levels. From employees to plants managers, everyone benefits from new technology.
Digital technology aims to provide **tools based on how things are really done on the job.** The tools make work easier. They are **more connected** and **collaborative, easier to use** and more mobile – in short, more efficient.

For example

All Renault plants will eventually be equipped with Wi-Fi and apps that already allow employees to access all the information they need - vacations, site closures, training and more – from their own smartphones.

Tablets have changed the way team – or UET – **supervisors work**. When it introduced the "connected UET supervisor" concept, the Valladolid plant gave each team leader a tablet for real-time access to production and quality data. This allows them to take action quickly; the photo feature lets them explain a production line problem with pictures and instant messaging facilitates conversations. They can respond immediately without waiting for interventions from the shop floor.

“By facilitating decision-making on the front line, digitization makes real-time management possible”.

– Jose Vicente de Los Mozos –

UET supervisor at 13 plants will be given tablets by year-end, freeing them of the need to go back to the workstation to connect to apps. The tablet saves them up to 90 minutes a day, time they can spend on the floor with their teams.

Virtual training has been introduced at the Valladolid plant in Spain, the Cléon plant in France and the Curitiba plant in Brazil to help teach operators and boost versatility in teams. It shortens the time it takes to develop and update training courses and also improves their effectiveness. Virtual training saves time and improves learning. **Newly hired employees can be trained more easily and are operational faster.**

Other advantages

Lower safety risks when new operators arrive and easy memorization during long intervention cycles.

PREDICTIVE MAINTENANCE

It remotely monitors equipment using dedicated software to display all data relating to machinery in **real time.** The job of maintenance technicians is being transformed. They can now **anticipate equipment failures** that can affect production, rather than respond after the fact. Technicians receive alerts on their tablets and can **connect to other sites or technical experts** to plan the operations to be performed and keep the other sites up to date. This prevents production stoppages and **guarantees the competitiveness of the production system.**

Predictive maintenance has already been deployed at the Cléon machining center in France, and will be extended to the Valladolid plant in Spain, the Sandouville plant in France and the Cacia plant in Portugal in the near future.

The goal

The goal of digitization is to improve agility and responsiveness at strategic points in the process: tracking components for maintenance, managing consumption (raw materials, energy, etc.) and ensuring traceability of parts right to end users. It covers all areas of the plant.

CREATE AN INDUSTRY 4.0

Sharing **best practices** among plants in real time creates an **Industry 4.0 production system** characterized by sharing and collective competencies. Renault's plant of the future is **collaborative and open** to its ecosystem, from suppliers to partners.

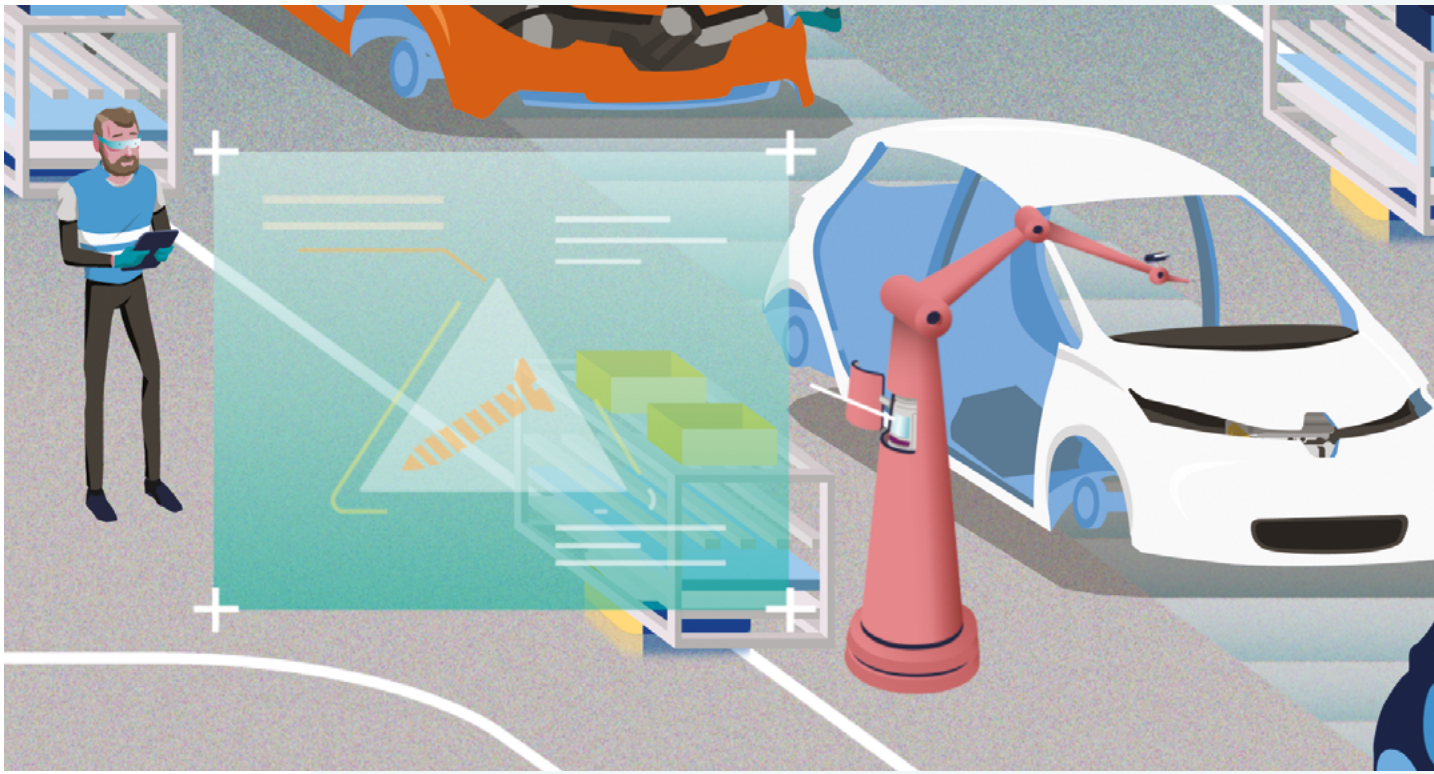
The new tools promote closeness to customers and further improve **quality control** to move from mass production to **individual personalized vehicles.**

Pilot plants

Each plant is free to test innovations, or "technology bricks." Once the concept has been proved, the innovation is added to the catalogue and can be deployed across Renault's plants. Renault also leans on designated pilot plants, notably Cléon in France, Valladolid in Spain and Curitiba in Brazil. These plants test innovations on a wider scale for subsequent deployment at other sites, building a performance foundation gradually rolled out everywhere.

RENAULT MANUFACTURING IN FIGURES

The manufacturing base comprises more than 66,000 employees, 36 production sites and 12 logistics sites.



“The cultural diversity of our sites is an asset, but the ability to apply the same fundamentals and deploy innovations over the world to meet customer requirements remains key to performance and is one of the objectives facing the plant of the future.”

– Jose Vicente de Los Mozos –

CAP 2020 COLLECTIVE AGREEMENT IN FRANCE

Employee dialogue is pivotal to the plant of the future.

In France, that resulted in the signature on January 13, 2017 of the Renault France CAP 2020 collective agreement on sustainable performance. CAP 2020 aims to build Renault's future in France for the next three years, based on three priorities: customer satisfaction, sustainable operations and employee motivation.

Commitments regarding French plants, the benchmark for Renault as a whole, include:

> **€500 million of capital expenditure** between 2017 and 2019 to improve plant performance (flexible production lines, automation, collaborative robots) and working conditions (renovation, improved workstation ergonomics and more).

> Proactive commitments regarding employment and training to develop competencies, ultimately leading to **3,600 permanent contract** hires and **6,000 fixed-term youth employment contracts.**

> Improved quality of life at work through, among others, empowering, participatory management, more widespread dialogue on quality of work, a revamped work setting and the right to connection for everyone at production sites.

SOME VOCABULARY

4.0: Plant 4.0 or Industry 4.0 refers to the fourth industrial revolution. The first brought mechanization; the second, electrification; and the third, electronics. Today's fourth industrial revolution takes the form of "smart factories" with computers and automation (digitization).

AGV: Automated Guided Vehicle, a robot that moves independently.

APW: Alliance Production Way. Production system shared by Renault and Nissan. Introduced at all plants since 2014, it combines the best of Renault's production system (SPR) and Nissan's (NPW).

Full kitting: Parts are prepared in kits close to the operators and the vehicles. This makes it possible to manage diversity and improve quality, while doing away with the need for operators to move around.

QR code: 2D bar code. "QR" means Quick Response, because the content of the black and white square can be decoded quickly.

RFID: Radio Frequency Identification. Active or passive tags that are able to communicate, used in labels for traceability.

UET: Unité Élémentaire de Travail, or basic work team. CUETs lead UET teams.

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