



Industry:

Manufacturing

Geography:

Global

Product:

CloudBees CD

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Ashish Agarwal
Senior Manager Global IT
AGCO

Building a Common Workflow, Standardizing Embedded Firmware Releases, and Helping to Sustainably Feed the World at AGCO

Contributed by Ashish Agarwal, Senior Manager Global IT, AGCO

When people think of farming equipment, they think about heavy machinery—like tractors and combine harvesters—and not IT. But there's more than mechanical muscle powering today's sophisticated farming tools. Software plays a big role in getting food to people's tables.

At the most basic level, embedded software is at the heart of vehicle control systems, managing the transmission, fuel, and steering assemblies on tractors. Farmers also use sophisticated software tools that combine GPS data and satellite imagery, plant and meteorological data, along with artificial intelligence to map out their fields and plan their crops. Farmers can then route this information to tractors that can then seed, sow, or fertilize fields autonomously or with the intervention of a driver/operator.

This technology is called precision agriculture, and it is revolutionizing farming. The average American farm is 444 acres, but many mid-sized farms in the Midwest clock in at 3,000–4,000 acres, and the biggest farm in the country occupies 190,000 acres. There's no way you can manage operations of this magnitude without some level of automation. IT is helping farmers optimize how they plant, fertilize, harvest, and rotate crops based on soil conditions, water consumption, and the weather.

Our Engineers Were Working at Cross Purposes

AGCO is a global enterprise and one of the world's leading suppliers of farming equipment and technology. Our best-known brands are Challenger, Fendt, Valtra, and Massey-Ferguson, a company that was founded in 1847 and sold some of the world's first mechanical threshers. I oversee our Global Engineering IT Electronics and Software operations and am responsible for the tools our engineers use to develop onboard software and electronics that power our tractors, combines, and other equipment.

In the past, the engineering teams at our various divisions independently developed the software that powered their respective brands. They used different tools, platforms, and processes, and pushed out their products using separate release cycles. Our engineers were building similar tools that performed identical functions. But there was no harmonization, and their solutions lacked cross-functionality and reusability.

The agricultural machinery business takes many of its cues from the auto industry. Like General Motors, AGCO products across our brands are built on common platforms and share many core components, despite differences in fit, finish, and advanced functionalities.

Social Share: Siloed teams = duplicate work.

For example, our 700 series tractors share the same engine, electronic transmission, 700 horsepower engine, and chassis regardless of branding. And yet our Massey- Ferguson engineers here in the United States were coding firmware independently of our Fendt team in Germany.

Standardizing Our Global Embedded Software Operations

About four years ago, we began to look at ways to standardize and improve the operations of our embedded software development teams from around the world. A working group was formed with representatives from all our engineering sites and listed all the problems our various teams were facing.

We identified common practices, processes, and functions that we could implement at all our offices. Next, we selected a CI DevOps platform to help us achieve our targets: Electric Cloud, which is now called CloudBees CD (formerly CloudBees Flow).

It was an easy sell. Reusability was top of mind, but automation was equally important. Many of our DevOps teams were pushing builds manually. Moving to a CI pipeline would save both time and money. CloudBees CD would enable our teams to track features at the branch level, which would allow us to manage both shared code and the customizations across our various brands.

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CloudBees CD also integrates with Siemens' Polarion, the Application Lifecycle Management (ALM) platform our engineering team uses to track the development process from the statement of the initial requirement to the final release. We can now track every single build through CloudBees CD back to our ALM. Our entire DevOps workflow is now fully visible within the broader scope of our centralized software and product management activities.

Rolling Out CloudBees CD

We rolled out CloudBees at six of our sites and received some immediate pushback, which we expected. One team was using a four-step DevOps process, the other went through 12 stages, and everyone was using different tools. Having started by finding common ground, we rolled out only those processes we could implement at every location.

Our engineering working group helped with this initial rollout and continued to offer assistance as we implemented CloudBees CD across AGCO's global operations. Each engineering site elected a representative who championed the new tool and also collected feedback from local teams.

We encountered some reluctance, but it was mostly the product of habit. Many of our engineers were uncertain about abandoning familiar tools and adopting something new. However, our working group was able to address their concerns and fold them into our definition of a global CI/CD pipeline.

Social Share: When trying to change your engineering team's process, sell them on the big picture.

Our site leads went back to their respective teams and showed them the bigger picture: faster builds, faster deployments, and a streamlined code repository. We never talked about cost reductions, but eliminating duplicate efforts at our various sites did lead to substantial savings.

The pushback didn't last very long, and we have now rolled out CloudBees CD at 90% of our sites. There is one holdout, an engineering facility that has many bulky workflows and customized pipelines that we're still in the process of streamlining.

Releasing Quality and Quantity

Thanks to CloudBees CD, we have modernized all of our software teams. We have also removed the silos that had them working in isolation. We now have full visibility and transparency. I can go to the CloudBees CD dashboard and see a history of software deliveries. I can tell you how many teams released a product in the last three months and see whether their firmware has made its way into equipment that is now in production.

Social Share: Thanks to CloudBees CD, we have modernized our software delivery process.

We are also pushing out new releases much faster. Before we adopted CloudBees CD, we issued updates once or twice a year. Quarterly releases are now the norm. If we spot a bug, we can fix it straight away. When a product manager asks for a new feature, our engineers can evaluate its viability, plot a credible timeline, and roll it out. We're releasing quality and quantity.

The Future of Smart Farming

CloudBees CD is helping AGCO build for the future. One day, I hope to build a CI/CD pipeline that will allow us to automate the deployment of firmware directly to electronic control units. We are also looking at the IoT and customer-facing analytics that will allow farmers who use our equipment to pull data from their machines.

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AGCO launched Fuse as an innovation hub and an open platform that allows our core brands and our global technology partners to bolster our customers' smart farming capacities. Fuse ensures that our products are compatible with mixed fleets across the entire spectrum of farm operations.

Fuse gives farmers the freedom to combine machinery and software from multiple vendors to establish a perfect digital ecosystem, thus ensuring sustainable crops and financial viability. It is also empowering our dealers to monitor machines and to provide advanced service and maintenance options that will reduce downtime and increase production.

AGCO is developing sustainable high-tech solutions with our brands, our partners, and dealers to help farmers maintain and grow their businesses so they can feed the world. CloudBees is working with us to plant the seeds for the future of farming.

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Learn more about AGCO

www.agcocorp.com