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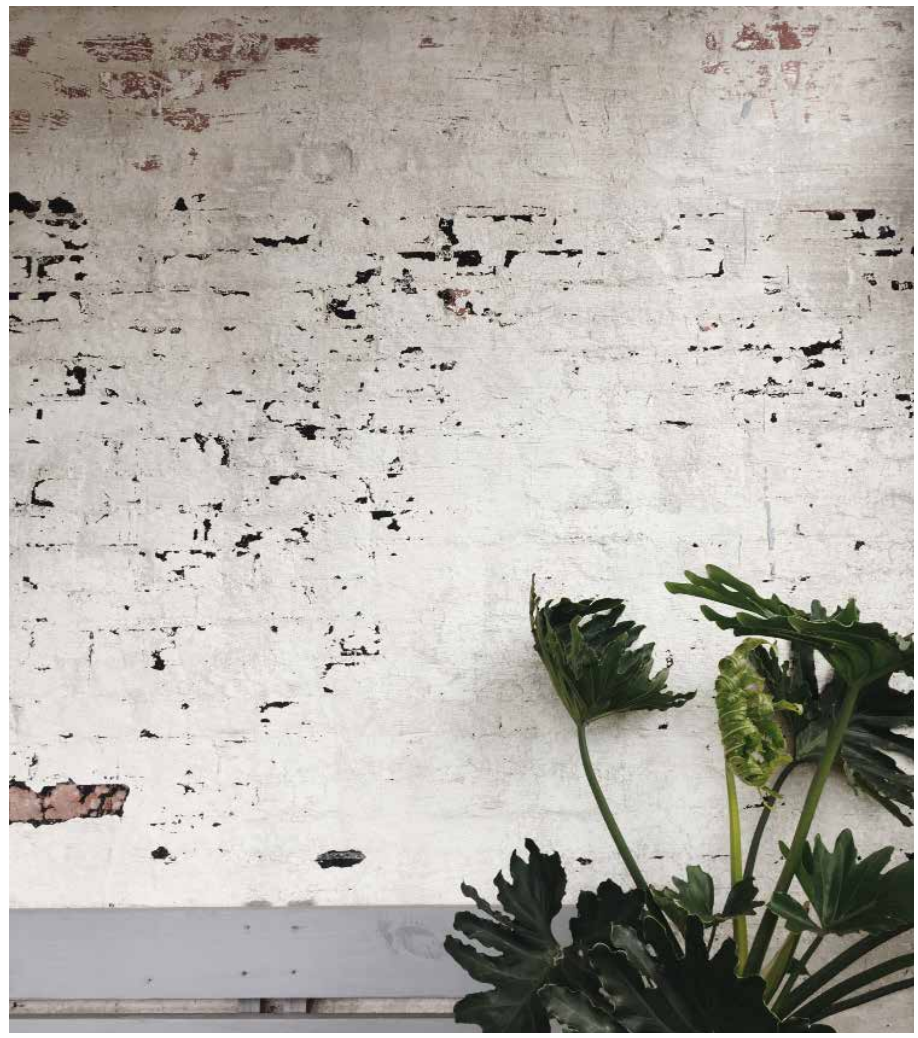
Beck et al. work. together.

Contributing to solving the world's food problems through efficient cloud orchestration of a wide range of interrelated smart farming tools.

# How to operate successful cloud management / an introduction by Beck et al. and KWS.



**The myKWS digital service platform from seed specialist KWS SAAT is a prime example of a modern cloud project. It shows how clients, cloud service providers, providers and digital agencies work hand in hand. With this approach, a large target group of farmers worldwide can be reached, and digital services can be made available to them. This enables farmers to significantly and sustainably increase their harvest yields.**

Initially, everything moved very quickly with digital services. The seed specialist KWS SAAT wanted to give its farmers the chance to significantly increase their harvest yield before the annual agricultural cycle was too far advanced. In 2015, the world's fourth largest seed manufacturer decided to help its buyers generate more income via the use of free digital tools to enable themselves to become the leaders of smart farming.

## The first version was online after a few weeks

However, there was limited time remaining until sowing began. Once it had started, the planned tools would not have been used by farmers for another year. This is why the company, based in Einbeck in Lower Saxony, decided to primarily outsource tasks. Digital agencies were hired to develop the services, external data was purchased, for example from weather and satellite services, and the platform was operated in the public domain Cloud from Amazon Web Services (AWS) by Beck et al. Helmut Weiss, project manager at the Munich cloud service provider, remembers: "The first version of the platform with a few compute instances, the necessary security and the connection to the KWS data center was created in a very short time."
Those were the comparatively humble beginnings. Today, KWS customers - and potential future customers - can access up to 28 digital services that accompany the life cycle of maize, rapeseed, sugar beet, cereals and other crops sold by KWS. They support farmers with the sowing, with the choice of the most suitable seed variant, check the fields for vitality and predict the ideal harvest time. In addition, they help the farmer with very specific localized weather data and with the so-called „Farmers Cockpit" in the management of the entire area cultivated by a farmer. At KWS, around 20 employees are currently working full-time in marketing, IT and in specialist departments. In addition, there are around 70 developers at the implementation partners who invest part of their workforce in the development or further development of tools.

**Up to**
**15**
**percent increase in yield**

## Much more sustainable agricultural work

Nils Busse, responsible for customer-related IT systems at KWS, is convinced that the digital services offered can increase farmers' harvest yield by up to 15 percent per year. "Farmers can achieve this increase simply by helping them make the right decisions at the right time. This can not only increase your yields, it also makes agricultural work much more sustainable."
In addition to this motive, KWS has certainly taken into account that a trend towards digitalization has also been developing in agriculture for more than ten years, and that it has been gaining momentum over the past five years.

## When data replaces gut instinct

As in every other industry, data now plays an enormous role, not only in farm management, but increasingly also in production. Choosing the right seeds for a certain soil quality, recognizing and combating a pest infestation as quickly and environmentally sustainably as possible and reacting correctly to the weather is no longer left to the gut feeling of the farmer in modern farms. Digital and mobile services, starting with the weather service, via satellite data on soil quality and plant managers, through to tools for site-specific cultivation of fields, support the farmer in their decisions and activities. The number of available digital apps is increasing every day. The digitalization efforts in agriculture are summarized under the term "Smart Farming".

If a farmer had to select, procure, operate and feed with data and implement the appropriate data analysis services themselves, larger farms would need their own IT department. No farmer could afford that. The suppliers in the field of agricultural machinery, fertilizers and seeds have long recognized this and therefore offer farmers an astonishingly high number of digital services with which they can sustainably increase their yields. Some of the services are grouped together in their own web or mobile portals in order to simplify their use for farmers and to guarantee them more operational and data security. myKWS is an example of this.

**50.000**
**farmers in**
**25**
**countries use myKWS**

## Acceptance for innovative spirit

Before the myKWS platform could achieve its current portfolio of digital tools, which is constantly being expanded, and which currently has 50,000 users in 25 countries so far, some development steps had to be taken. The development of new services by the commissioned digital agencies represent only part of the innovation work that is visible to everyone. But the part of the platform that is invisible to the end customer, cloud infrastructure, platform services, networks, security, required at least the same effort and the same innovative spirit.

In this area, KWS has been supported by cloud transformation partner Beck et al. The company, with headquarters in Munich and subsidiaries in Brazil, Switzerland and Romania, can now rely on experience from numerous cloud projects at large and medium-sized companies. "We have been involved in cloud projects for 8 years now. We know all the current technologies in the field, work at eye level with the hyperscale, who value our know-how and our way of working, and we do everything we can to understand the business processes of our customers at an early stage. In this way we can show them the best ways in which we can support them with cloud and other IT technologies" says Siegfried Lautenbacher, managing director and founder of Beck et al.

**Beck et al. is an architect, orchestrator, consultant and operator**

Beck et al. acts as architect, orchestrator, gatekeeper and operator for the technical platform of myKWS.

If myKWS, at that time still under the name Cultivent, initially ran on fixed instances in the AWS cloud, many services would now be implemented as cloud native. Where this type of serverless workload does not work, Beck et al. relies on container technology like Docker. Only a few services still run on instances because they do not meet the technical requirements for the modern type of cloud computing. The main advantages of Lambda applications (this is what AWS calls its cloud native services) and containers are easier automatic scalability, lower management costs and significant cost savings.

In addition, Beck et al. ensures that data can be exchanged between the internal business applications and the myKWS services where necessary - for example with the ERP and CRM systems, but also with the product information system. „The seamless connection to our core systems is necessary so that the myKWS users do not have to make double entries and the core systems on the other hand can integrate the current information from the customer" explains Busse.

**8**
**years project experience in cloud computing**

## Cloud service provider as innovation and transformation partner

"Cloud computing is developing at a very high speed" explains Helmut Weiss from Beck et al. "What was state of the art yesterday is old and expensive today because it does not use the capacities offered by a modern platform as well as service scenarios can. Our job is to provide our customers with the most effective platform at the best price at all times. That is why the services that were initially brought into the cloud by "lift and shift" have now largely been implemented in cloud-native architectures. Beck et al. therefore rightly sees itself not only as a service provider at myKWS, but also as an innovation and transformation partner.

## Large workshop of tools

Today, AWS offers many possibilities to meet the requirements of a cloud service provider like Beck et al. This ranges from server or storage instances as cloud infrastructure for hosted applications to a platform as a service, which offers native cloud application functions for development, deployment and security, to special services such as migration, data management and analytics. For many digital and IT functions, a company no longer needs its own IT infrastructure or its own development platform. Cloud providers provide all of this and, because of their large economies of scale, can offer this for a much lower cost and with more flexibility than a company in its own data center could. Especially when it comes to innovative technologies, the hyperscalers and their now vast range of technology partners sometimes have strong technical and economic advantages.

**28**
**digital services on myKWS**

## The business benefit must always be achievable

However, one prerequisite must be met: As a rule, companies need the expertise and manpower of a cloud service provider that is technically up to date and familiar with the service and price offering of competing cloud providers. Equally, such a provider must also develop an excellent understanding of the business processes of its customers and, if required, be able to operate or support infrastructures on-premises.
"We pick up the customer where they are and ensure that they do not get stuck in dead ends anywhere on their journey to the most effective infrastructure possible," explains project manager Weiss. The service provider must constantly keep an eye on new technical possibilities and evaluate them from the customer's perspective. "We always have to ask about new services - use that for our customers and their customers." New technologies and services are only used when the effort and income can be balanced, that is, the users get state of the art new functions, processes run more effectively or costs are saved. "We don't do anything for the sake of technology. The business benefit must always be achievable."

## Keep complexity down

Beck et al. also ensures a certain architectural consistency. The service provider knows the big picture. They know what the individual myKWS services need in terms of network infrastructure, computing power, storage and interfaces in order to connect them to other myKWS applications. In addition, it is clear to the service provider which external data (e.g weather data, satellite images, customer master and movement data) the myKWS services must be supplied with. To ensure that the services get what they need quickly and effectively, Beck et al. offer their developers the most appropriate AWS infrastructure services, which results in usage clusters. And the more developers that can use the same or similar services, the more the complexity of a platform can be reduced.
This also has positive effects on the scalability and speed as well as the price that AWS has to pay for it. As in other industries, the „unit costs" decrease when the number of units purchased increases. In addition, with a manageable service portfolio, the required capacities can be better planned which also affects the price. The longer the time period for which a customer pre-books a particular service, the lower the price.

## Constant rightsizing

"That doesn't mean that we don't allow deviations. It can happen at any time if there are reasons for it. But if we can provide something just as well with our mainstream services, then we choose from this portfolio because it is simply cheaper for the customer than buying a large zoo of services that are used less" explains Beck et al architect Fernando Schubert.
Speaking of price, because of the very diverse range of AWS services and their many different forms of administration, a good cloud service provider has to keep an eye on the dynamic prices of competitors in addition to the technical development to carry out constant rightsizing. This is something that KWS demands. After all, the services don't cost the end customer anything and as such, the cloud costs must remain manageable.

**Factor**
**6**
**Beck et al. reduced the cost of some infrastructure services that much.**

## Costs rise much more slowly than functionality and user numbers

"We manage it very successfully. The platform has been growing rapidly for four years, but the costs are developing much more slowly in comparison" says Fernando Schubert.

## Technology changes reduce costs

The following example shows how large the cost differences can be for realizing a function. Until recently, KWS had to rent a 10-terabyte hard drive for image data from AWS. This hard drive alone cost €1,504 a month. After a few discussions with the developer and KWS, the technology was adapted so that the image data on Amazon Simple Storage Service (S3) could be moved. Compared to the previous list price, this is more than 6 times cheaper. Other ways to save are by booking capacity lots. The longer the period for which you book a fixed volume of a service, the higher the discount. With booking times of 12 months instead of 1 month, the list price is reduced by up to 30 percent. Another interesting way to reduce costs is with AWS Spot Instances. As in a spot market for oil, you can buy it much cheaper here. These Spot Instances are currently free capacities that can be booked up to 90 percent cheaper. However, they are only available to the booking party as long as they are not needed by another customer who is booking capacities for a longer period of time. "That means they can be disconnected with just a few minutes' warning" reports Schubert. "As a service provider, we have to make sure that we only use them for workloads that can handle them, that is, that just run slower and don't break off. This is only possible with cloud native services. Typically, Beck et al. use spot capacities to cope with usage peaks. The basic requirements of an application, on the other hand, are covered by firmly booked capacities. Another worthwhile field of application for spot capacities is big data analysis or large batch processes. These are clearly defined tasks that are not particularly time critical. These can be managed when the spot market is offering particularly attractive prices. "In order to use the spot market, which, by the way, is only offered by AWS, the service provider must be very knowledgeable and have its cloud management tools under control, otherwise it doesn't work at all and can even be dangerous," says Schubert.

## Cloud shortens the time to market

Beck et al. sees this very active cost management as a confidence-building measure for the customer. "KWS, for example, trusts us very much. For us as a service provider, this gives us more room to maneuver, which makes life easier and less bureaucratic for us and our customers" he says.
The Beck et al. architect rated the numerous technical and price options that AWS offers as extremely important for several reasons. On the one hand, they bring flexibility to the projects in terms of capacity/scaling, costs and technology. They also bring enormous speed advantages. "For new projects, I no longer need to set up the infrastructure and platforms myself, I can simply book them online," explains Schubert. That alone can accelerate the time to market for larger projects by months.

## AWS is impressive

When asked why AWS and not another cloud provider, the architect emphasized that Beck et al. also work intensively with other providers, however, both the number of services available and the globally well-distributed capacities at AWS are far more impressive. "Especially in international projects like myKWS, which is now available in 25 countries, local capacities are important."
In addition to orchestrator, consultant and coach, Beck et al. also took over the operation of the myKWS platform in the cloud. All infrastructure services are monitored for performance, availability and costs. "We manage it preventively. In other words, we initiate appropriate measures before a bottleneck occurs" reports Schubert.
In addition to the big lines, Beck et al. also advises developers of the digital agencies on smaller matters. They are constantly connected to them via collaboration tools (Slack) and can have questions answered via the so-called "extended workbench".

## What's next for myKWS?

KWS wants to expand the platform further. First and foremost, it should continue to act as a customer loyalty program. However, the collection of non-personal data will also remain important. "The more information we have about the cultivated areas, the better we can support the farmers. We want to continue on our path as a premium seed supplier who offers premium services" explains Nils Busse from KWS SAAT. Obviously, the seed specialist has long understood how to position itself as a successful player in the age of digitalization.

## Do you also want to offer your customers digital services?

We support our customers in realizing cloud-based services and infrastructures. We orchestrate, manage and operate them. This is a variant of our offer to help customers to fundamentally renew their business-critical systems (disruptive and non-disruptive), to update or simply to keep them in operation effectively. We use a wide variety of technologies and approaches for this such as cloud native tools, artificial intelligence, machine learning or modern automation.

## Do you have any questions or would you like personal advice?

Contact us - we will be happy to help you!
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# Thank you.