

Cloud **and** on-premises: an unbeatable team



Data management in the cloud is on the rise and is approached differently in the system architecture. The board members Dr. Alex Ehrler and Michael S. Murgai compare two scenarios and interpret PDTec's system architecture.

Dr Ehrler, where is the market in terms of data management in the cloud?

Alex Ehrler: Many of our large clients are in the automotive OEM and 1st-tier supplier business environment — all of them high up in the supply chain. To put it bluntly: the leap to the cloud has not yet been made consistently in data management. However, the methodologists in the specialist and IT departments themselves attach great importance to ensuring that the versions of the applications currently in use are already cloud-compatible — keyword here is investment protection.

What is currently still a challenge is the protection of the intellectual property of design and si-

mulation data and the willingness to manage this outside of the company's own IT infrastructure. However, a change in thinking can be observed here, partly because decision-makers increasingly belong to a generation for whom cloud and SaaS are a natural part of a modern IT landscape.

Michael Murgai: Another challenge is the large amounts of data that are now generated in the simulation and design domains. After all, we are talking about petabytes of data for a typical engineering service provider! When this is combined with the costs that hyperscalers charge for storage and data transfer, those responsible for budgets start to think. This calls for a dedicated cloud strategy.

So what is PD Tec's answer?

Alex Ehrler: Our strategy is to meet the challenge of data storage with on-premises and edge computing approaches. Dedicated software components for storage and transfer of mass data can be installed in the user environment and are therefore an order of magnitude cheaper because the transfer volume and transmission distances are reduced. This is an interesting option that we are already designing with our customers as part of pilot applications. However, I assume that complete cloud connections for engineering data management will only be seen in industrial practice in about two years.

Michael Murgai: The change in strategy from on-premises to cloud connections is already quite clear today: Five years ago, the cloud topic was discussed perhaps once in five sales cases, but in the further course of the clients' projects, on-premises implementations were always used. Today, however, almost all clients ask about a cloud connection — the topic is therefore relevant in 100 percent of cases, and no longer just in 20 percent. Everyone takes the cloud topic seriously and wants to form an informed opinion on it. There is interest in capacities from the cloud, precisely because scaling is much easier. Comprehensive IT security can also be mapped much better in the cloud.

When talking about cloud computing the term 'platform' quickly comes up.. Does PD Tec want to undergo a metamorphosis into a platform provider?

Alex Ehrler: EActually, that has always been our strategic vision. Generally speaking, our platform strategy has two thrusts. On the one hand, it aims to make efficient data management of different domains such as CAD, simulation or technology data management possible in a uniform technical infrastructure. The advantages are a consistent technical basis for data exchange, simple installation, and economically attractive operation of the entire system, either in a server or cloud infrastructure.

The second goal is the technical integration



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Dr. Alex Ehrler
Board Member of PD Tec AG





“Our product strategy offers customers a very special competitive advantage: Thanks to a convincing migration path from on-premises to a modern cloud environment, it is possible for customers to start on-premises, for example, and later switch to the cloud at the right time. Or vice versa. The great thing about this is that it feels like nothing changes for the end user, as we use the same source code on-premises and in the cloud.”

Michael S. Murgai
Board Member of PD Tec AG

of different domain applications. Through uniform data model management with common basic data models, the technical data models of the respective application domains can be implemented uniformly and integrated on the basis of common technical properties, so that consistent use of data from different domains in application processes is possible.

PD Tec's platform approach provides the basic system architecture for successful cloud deployment. This also enables the modularization of the data management system through services of the appropriate design.

Is it possible to develop a unique selling point with a special cloud approach?

Alex Ehrler: Our strategy is not to take a separate path for the cloud. The cloud capability of the software platform comes almost automatically with a clean system architecture. This means, for example, that the individual software layers are cleanly separated from one another.

In a 3-tier web application server architecture, the relevant software services are in the middle layer, the application tier. Here it is important to set up a clean service structure, with the services being classified into clearly defined categories. Each service is then implemented according to an architectural pattern specified by the software platform for the respective category.

Overall, this results in an architecture based on the principle of microservices, whereby the individual services are loosely coupled to one another, but with a dependence on the storage layer.

After all, we are involved in data management. As soon as the technical software functions are structured in services with a reasonable level of granularity, these can then be packaged both for a classic deployment on on-premises servers and in a container infrastructure for cloud deployment.

Michael Murgai: We are convinced that a competitive advantage for us is being able to show the client a convincing migration path from on-premises to a modern cloud environment. Other providers have often acquired cloud solutions for this and offer different technologies based on them, but this means that different tools



have to be used. In the latter cases, the migration from on-premises to cloud is equivalent to the introduction of a new solution, with, among other things, new technical requirements having to be created and the users needing to be completely retrained. This significantly increases the risk for the client.

But we say that with the same technological basis, a conventional on-premises and cloud application can be operated equally well. In other words, the user does not notice the migration to the cloud — no user training is necessary. With this approach, PDTEc helps its clients to practically eliminate risks.

Alex Ehrler: Cloud strategies are of course also related to the different business models that individual providers pursue. There is one category that basically only pursues a SaaS model, such as Salesforce. They operate everything themselves in a homogeneous cloud infrastructure. Such a software architecture does not have to take alternative deployment scenarios into account. However, such software would not work in an on-premises installation. If you choose a hybrid approach, as many of our clients do, because you want to support both options over a longer period of time, you are much more flexible with PDTEc's approach. The clear focus on a service-oriented architecture not only guarantees cloud capabilities, but also better maintainability and modularization, for example so that individual components can be easily replaced with new ones. This means that infrastructure services for which a Hyperscaler has a counterpart in its portfolio can easily be substituted by these. For example, you can save yourself the trouble of installing a database server and use Azure SQL instead, or replace your own Vault service with AWS S3. This also reduces the effort required to manage the software. Of course, the corresponding service levels must be ordered from the service providers.

With a cloud connection, you want to buy flexibility. What scaling scenarios are conceivable?

Indeed, scaling is actually one of the most important aspects in the design of the application tier. The software services must not only have the right granularity, but they must also fulfill certain properties. It is crucial that the services are stateless and that they do not require session affinity. This means ensuring that it does not matter which instance of a service processes request. It must be possible to put any number of instances of each service into operation and distribute the requests across any instances. Such an architecture offers two advantages in particular:

- High availability — if one instance fails, other similar service instances can take over the task.
- Load distribution – if 500 users access a service at the same time instead of 100, three or four more service instances are automatically put into operation and the functionality is provided by several nodes.

Michael Murgai: In the future, we will need standardized, open system architectures with a modularity that ensures scalability using apps and services. Cloud technologies will act as a kind of afterburner. There is a popular saying: Data is the new oil, which means that it must be able to flow — so

that data can be used efficiently across applications, for example for training AI models. Cloud technologies offer attractive opportunities to integrate and interact with applications from all sites in the world —provided the applications are open. PDTEc's system architecture is designed precisely for these promising scenarios. And because we do not offer any authoring systems ourselves and are open to all authoring systems that our clients use today or want to use in the future, we have to be open by definition in order to be able to enable the fundamentally important data flow today and in the future.

Dr. Ehrler and Mr Murgai, thank you very much for this informative conversation!