# CAD-CAM REPORT
## ENGINEERING

# Data exchange on the fast track

PROSTEP
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# Data exchange on the fast track



*Thanks to the Web-based data exchange platform OpenDXM GlobalX from PROSTEP, data at Porsche now makes its way to the intended recipients up to a hundred times faster than over ISDN.*

*H*ave you ever tried sending 34 gigabytes of data over the Internet? It doesn't present a problem with OpenDXM GlobalX. The automotive manufacturer Porsche is using the Web-based data exchange platform from PROS-TEP to exchange large volumes of data with its suppliers quickly, re-liably and securely. It is not only the product developers that are using the solution, but also their colleagues from Production, Sales and other departments. And, of course, the partners with whom they are exchanging data.

Michael Wendenburg,
trade journalist, Seville

In common with other top-end car ma-nufacturers, Porsche has been constantly expanding its range of models over the past few years in order to attract new customers and to meet the demands of new markets. The four models Boxster/Cayman, 911, Pana-mera and Cayenne are now being built in an increasing number of variants and custom configurations. Thus, for instance, the Ca-yenne and Panamera are now available with hybrid drives. The product developers in Weissach are squaring up to the challenges of eMobility and recently sent out the first prototype of an electric-powered Boxster for testing on the streets of Stuttgart.

The number of external development partners and suppliers has grown in line with the increasing number of different ve-hicle models and, for instance, the integra-tion of ever more electronic systems such as driver assistance systems to increase safety on the roads. As a result, an incre-asing amount of product data needs to be exchanged. This includes not only CAD mo-dels, but also electrical and electronic data, simulation data for crash tests, as well as flow analyses and other documents needed for development or production, right up to training documents for the global sales or-ganization. In particular, the data packages for simulations can run to several gigabytes, which makes it impossible to exchange such data electronically over conventional ISDN lines. Although Porsche has for many years been using PROSTEP's robust data exchange manager OpenDXM, which communicates directly with the OFTP software used at Por-sche, to send mass data from the Mechanical Design department, no comparable solution was available for other departments or for exchanging other types of data. In the past, one of the solutions was to place the files on

an FTP server where suppliers could pick it up. However, this solution was only available to a restricted group of users because it was linked to the ENX transfer system. A range of workarounds had to be used for other suppliers. Small quantities of non-CAD data were often encrypted and sent by e-mail, while larger quantities where either burned on DVD or saved to removable disks and then dispatched by regular mail, in which case it could be days before the recipients had the data in their hands.

„There was a plethora of different procedures that were no longer able to cope with the growing volumes of data and our security expectations," says Steffen Kopp, who is responsible for the CAx collaborative process in the IT department at Porsche. By mid-2008, with a large number of projects with external partners in the pipeline, the time had come, with the blessing of the company management, to look for an alternative. The project team, which comprised key users from different development departments as well as IT security experts, saw demonstrations of various different solutions and shortlisted three of them. These were installed for evaluation purposes in order to determine whether they met the necessary requirements.

The requirements list was pretty extensive. „There were a number of important criteria: in addition to Web support and the possibility of integrating the solution into our supplier portal, we also needed support for our standard IT platforms, user authentication, scalable encryption, good performance when exchanging large files, restart of a transfer after interruptions and seamless logging of all exchange operations," explains Dr. Harald John, who, in his role as project manager for PDM information systems, had the responsibility of selecting the system. Steffen Kopp adds „we also wanted to automate certain processes in the context of data exchange."

## Convincing security concept

The Web-based data exchange platform from PROSTEP was a relative newcomer to the market at the time the system was chosen. Product manager Udo Hering recalls that Porsche was indeed the first customer to use OpenDXM GlobalX productively. There were two decisive arguments in favor of choosing the solution: On the one hand, it was a pure Java Enterprise application, which meant



*Porsche's key objectives in rolling out OpenDXM GlobalX were to provide better support to users when exchanging data and to enhance data security. – and both goals were achieved, to the evident satisfaction of Steffen Kopp, who is responsible for process chain collaboration in the product creation process in the IT department, and of Dr. Harald John, Project Manager in the product creation process unit of the IT department. (Photograph: Wendenburg)*

that it was the easiest solution to integrate in the existing IT infrastructure, a consideration which also had a knock-on effect on costs. On the other hand, it met all the key requirements laid down by Porsche, in particular with respect to data security and performance when exchanging large volumes of data. Steffen Kopp: „Independent security experts validated the protection mechanisms provided by the platform by carrying out penetration tests, so the solution is now approved for exchanging confidential data."

At Porsche, the data exchange platform was installed on a separate server in the DMZ (demilitarized zone outside the secure internal network), and this server communicates with the portal server and selected servers in the intranet over different ports. The security of the data is ensured because it is stored in encrypted form in a Web folder structure when it is uploaded to the platform, and only authorized recipients are permitted to access this. Users who have been approved to use OpenDXM GlobalX are authenticated using the Porsche Partner Network (PPN). This means that they must log in at the portal from a computer that has the corresponding personal certificate and using their own password.

The encryption of the data is based on a public key infrastructure that uses a public key and a private key that is automatically stored on the user's computer the first time they log in. Because encryption of large quantities of data using up to 4096 bits would be extremely time-consuming, OpenDXM GlobalX uses a two-stage process in which the user data is first encrypted using a symmetric key – the data key. This is then encrypted a second time using an asymmetric key. Encryption and decryption are carried out using different components of the key. The recipient's public key is used

for encryption and the private key for decryption.

The data is encrypted and decrypted automatically when it is uploaded or downloaded, so the recipients do not have to enter any keys to be able to open the files. OpenDXM GlobalX informs the intended recipient when new data becomes available in their Web folder and also notifies the sender by e-mail when the data has been downloaded. The data in the Web folders can be deleted automatically after a certain period or following certain actions, although the log indicating what data was provided and when is retained. The cleanup function can be configured separately for each folder, although, as Steffen Kopp explains, „this function does not yet work in exactly the way we want. But Porsche's requirements have been implemented in the new Version 7.1 of OpenDXM GlobalX."

At Porsche, the Web platform is linked to the existing OpenDXM application via the OpenDXM GlobalX Gateway, with the result that the developers in the Mechanical Design department are also able to use the portal to make their CAD data available for download. As a rule, they will do this if they need to send large quantities of data and their partners do not have an OFTP connection or only have a low-bandwidth connection. Dr. Harald John: „The data is transferred up to a hundred times faster over the Web portal than over an ISDN line, depending on how many people are transferring data simulta-

neously. The Internet is also the most cost-efficient solution in respect of bandwidth."

Whereas other departments and user groups have to check the data out of the various backend systems interactively and then upload them to the server, the CAD users can use the automation functions provided by the OpenDXM GlobalX Gateway. At Porsche, OpenDXM has been integrated into the CAD data management system P-DMU so that users can initiate data exchange directly from their familiar working environment. Processes such as checking out, formatting and sending the CAD data run in the background but are monitored and logged by OpenDXM. The partner profiles contain the recipients and associated OpenDXM GlobalX accounts for which the data is made available for download in Web folders via the gateway. Currently, 70 of the 1300 partners defined in OpenDXM are provided with CAD data over the Web platform.

It remains to be seen whether Porsche will at some time completely replace Open-DXM with OpenDXM GlobalX. According to Steffen Kopp, the Web platform has the necessary potential but does not yet offer the complete range of functions provided by the data exchange manager, which also controls preprocessing and postprocessing of the data in the user environment. Although the Remote Action Controller (RAC) already allows users to initiate certain standard processes in the intranet, it is not, for instance, possible to initiate recipient-specific conversion and check routines as with OpenDXM.

### Rapid increase in user numbers

OpenDXM GlobalX was piloted at Porsche in mid-2009 with a limited number of key users in order to allow a rapid response to any possible errors and to ensure the best possible support during the rollout phase. Steffen Kopp: „Although the software was still very new, there were far fewer issues than we had expected. We had almost no downtime and were able to guarantee the necessary reliability virtually from the word go." Availability is now above 99%, which is above the level stated in the requirements specification, despite increasing user numbers and data volumes. In the third quarter of 2011 alone, 611 gigabytes of data were uploaded and 768 gigabytes were downloaded.

The largest file transferred to date was 34 gigabytes in size. This is a breeze for the
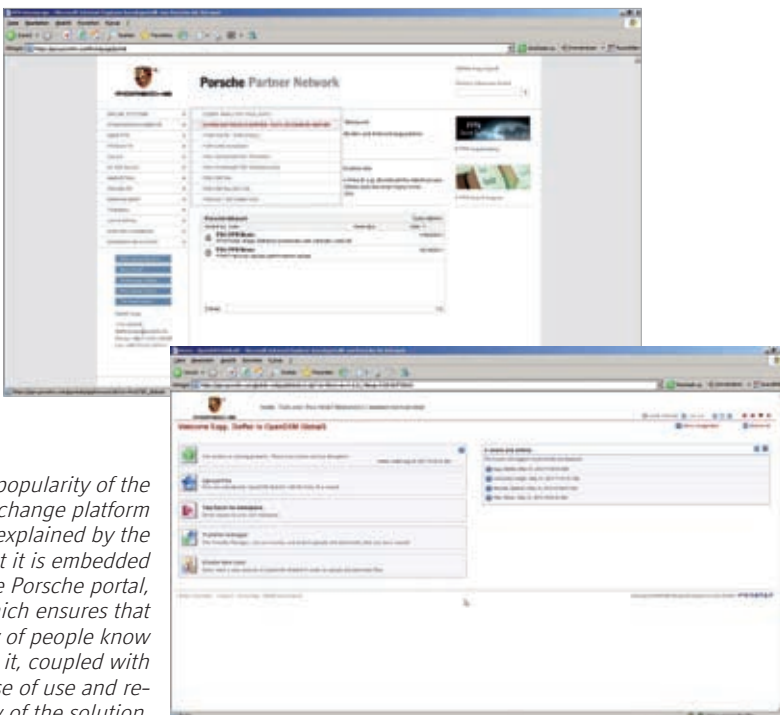


*The popularity of the data exchange platform can be explained by the fact that it is embedded in the Porsche portal, which ensures that plenty of people know about it, coupled with the ease of use and reliability of the solution.*
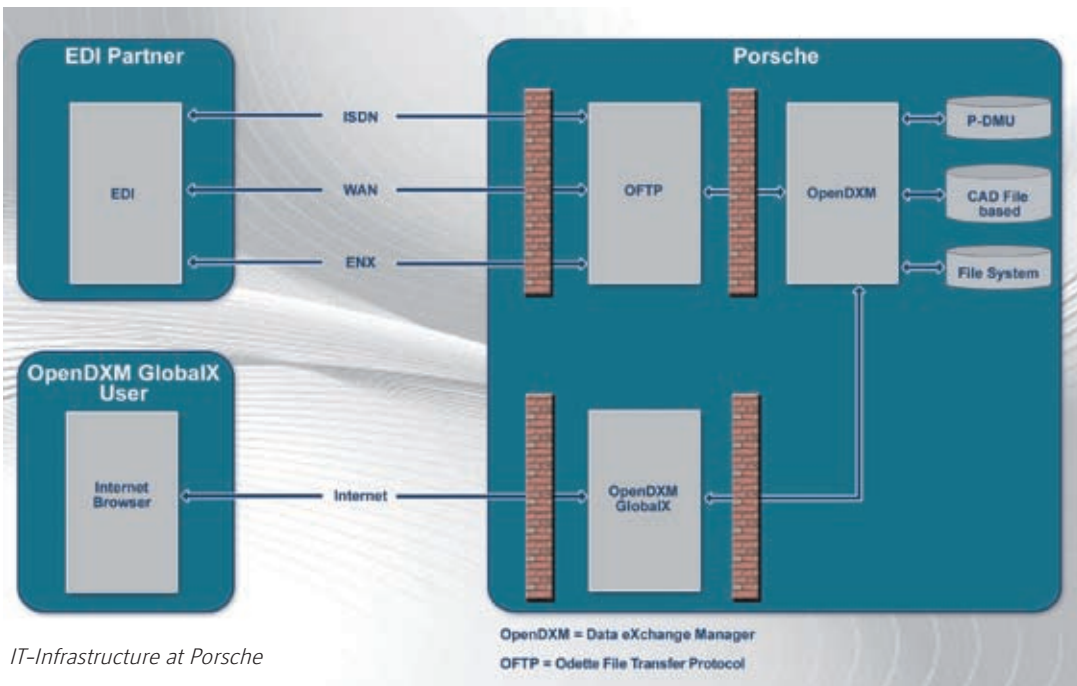
*IT-Infrastructure at Porsche*

PROSTEP software, which is explicitly designed for the asynchronous exchange of large quantities of data. When exchanging large quantities of data, the speed is determined not only by the bandwidth available on the network, but also by the latency between sending and receiving the individual data packets, which can add up to considerable delays over long distances and with very large numbers of data packets. In order to counteract this, PROSTEP developed a special protocol that uses multithreading to transfer the data in an HTTPS session, i.e. it distributes the data over several channels. If, despite this, the connection still fails, the algorithm ensures that the transfer is resumed at the point at which it was interrupted.

The data exchange platform is currently actively used by around 1000 users, who place the data in one of more than 200 project webspaces or download it from these. Around half the users are external development partners and suppliers, and the other half are internal Porsche staff from a wide range of departments. As well as product developers from all disciplines, an increasing number of colleagues from Production, Sales and Administration are using the solution to exchange data and documents. Steffen Kopp assumes that the number of users will continue to grow: „For the final configuration, the figure will be something between 2000 and 5000 users."

The popularity of the data exchange platform can partly be explained by the fact that it is embedded in the Porsche portal, which ensures that plenty of people know about it, although the ease of use and reliability of the solution certainly play their part. According to Harald John, „both internally and externally, the level of acceptance is extremely high, because the users can see the benefits." They do not even need special training. Instead, they are provided with a brief overview and can contact the hotline in Porsche's Application Systems Competence Center if they have any questions. John adds: „One enhancement that would be useful for users would be to avoid the need to upload or download the data, but instead to synchronize the Web folders with the folders on their local drives or to simply drag and drop the files." According to Udo Hering, PROSTEP is already working on a solution of this type.

Porsche's Key objectives in rolling out OpenDXM GlobalX were to provide improved support to users when exchanging data and to guarantee data security. „We have most certainly achieved these objectives," says Steffen Kopp in conclusion. „It was a strategic decision that came down from top management and was not primarily driven by cost/benefit considerations. Nevertheless, we and our suppliers have seen a visible reduction in the time and costs spent on data exchange as a result of using OpenDXM GlobalX."

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