SICP – Software Innovation Campus Paderborn

WindCORES – Digital Transformation with Renewable Energy

Figure 1: View inside the tower of the wind turbine

Using renewable energy for data centers is a well-known challenge and topic. Plants that use biogas, geothermal heat or water are already in operation. A novel idea where innovative and obvious fusion of wind energy with the service of IT hosting are combined laid the foundation for the project WindCORES. The purpose of wind turbines can be more than generate ecological and renewable electricity. Wind turbines provide the flexible, economical and sustainable solution for operating IT systems that is often lacking. Thus, wind turbines are becoming an important element in the digital transformation of companies and administrations that need or want to operate their IT safely, easily and cost-effectively.

To address the before mentioned challenges, the joint patent-pending concept WindCORES has been developed in cooperation of the Software Innovation Campus Paderborn (SICP) of the University of Paderborn, WestfalenWind IT, InnoZent OWL e.V., Innofactory GmbH and the dtm group. The IT Systems are located within the pillar of a windmill. WindCORES offer IT systems a secure location and the supply of renewable energy. From single racks spread among independent WindCORES upto exclusive use– your benefit: According to any customer specification requirements WindCORES can be newly developed and individually configured within a very short time. The strength of the patented WindCORES architecture is an innovative flexibility that fulfills all standards with its customized modular solutions.

Based on the WindCORES concept, in Lichtenau Germany's first computing node and data storage could be built in a wind turbine, which is in operation since October 2017. In Lichtenau, WindCORES reconciles renewable energy and the increasing energy requirements of computer systems: four fireproof IT safety cabinets are installed at the foot of the 13 meter wide and 150-meter high reinforced concrete tower of the wind turbine, each housing 62-height units (see Figure 1). The wind turbine supplies the computers with electricity directly on site and thus has a further benefit in addition to the generation of green electricity. In addition, the operating costs

are lower, because the electricity costs can be reduced by up to 50 percent to 15 cents per kilowatt-hour.

In addition, the data stored in IT security cabinets is protected against unauthorized access and electromagnetic compatibility (EMC) faults. This allows a nearly lossless, multiple connection to other renewable energy producers and the necessary communication networks.

Another strength of WindCORES: companies that use the concept know exactly where their data lies and where their computing processes take place. In addition, a company can network directly with the computing node and data storage in the wind turbine. In addition, it is possible to virtually connect several plants equipped with WindCORES in one wind farm. This allows the data to be scaled as desired and the service availability to be actively configured via the application layer.

Advantages through WindCORES:

■ Low operating costs: Why only 15 ct/kWh? The deep, highly secure integration of your IT in our wind parks allows a direct, multiple connection to our power supplier and communication networks. Moreover, we pass on price advantages to our clients. Thus, we can beat market-based prices up to 50%.

■ Flexible Scalability: Why flexibility? You use all advantages of our distributed WindCORES architecture. Determine the physical degree of distribution along racks or WindCORES. Individual definition of scaling and availability – for IT systems or applications – to your need!

■ Distributed architecture: Why not a traditional building? A high availability is difficult to reach with a traditional colocation infrastructure. Sustainable power supply, needs-based cooling, distributed location and a high degree of efficiency – all this will be usable for your IT hosting in the WindCORES architecture.

■ Efficient Sustainability: What's our sustainability? We use synergies! Direct energy supply by renewable sources in all WindCORES! Existing, access protected rooms of our reinforced concrete towers will be upgraded and racks will be additionally secured by safes. All infrastructure elements will be integrated to maximize availability, efficiency and profitability.

The first critical customer of "WindCORES" is the Center for Information and Media Technologies (IMT) of the University of Paderborn. The IMT will carry out a test operation in the wind energy plant in Lichtenau starting from commissioning of computational nodes and data storage in order to determine all important performance values.

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