Project Report

System 800xA
Server virtualization saves Mälarenergi running costs and increase reliability

Virtualization replaced thirteen physical servers with two. Three of the virtualization project team members gathered in the plant's main control room. From the left: Krishna Kumar, ABB, Kjell Thuné, Mälarenergi, and Jonas Gustavsson, ABB.

Mälarenergi operates one of Europe's most efficient heating and power plants, utilizing as much as 90 percent of the total fuel energy content. One key reason behind this impressive figure is the company's commitment to always using the best available technology in its facilities. ABB's System 800xA was thus the natural choice for controlling the heat and power generation process. When the time to upgrade the system arrived, Mälarenergi wasted no time in optimizing its server hardware via a virtualization project run jointly with ABB. The result was a great success – and achieved without the slightest disruption to operations.

Mälarenergi is a large, municipally-owned energy company in the Mälardalen region of central Sweden. The municipality is the sixth most populous in Sweden and the country's fifth largest urban area. The company's mission includes providing heating, electricity, water and broadband services for many of the region's inhabitants. To help fulfill this role, Mälarenergi operates a combined heat and power plant (the largest of its kind in Sweden) in the principal city of Västerås.

Complex plant with high demand on reliability

This energy plant is a complex facility, and with so many consumers dependent on it's output, high operational reliability is essential. The main boilers and turbines were supervised by System 800xA from the main control room supported by a number of servers, including process servers and servers to which computational computers were connected. All in all, Mälarenergi operated thirteen servers directly related to plant operation.

Börje Horsell, who with Kjell Thuné is responsible for process automation at Mälarenergi's Västerås plant, realized that running so many servers was far from ideal in terms of running costs and management resources. Together with ABB, they decided to implement a System 800xA virtualization project focused on server consolidation.

“Thanks to the virtual servers, the time needed to implement the System 800xA upgrade could be kept very short.”

Ingemar Larsson, the ABB sales manager responsible for Mälarenergi

Virtualization – a brief explanation

Virtualization is when software is used to simulate hardware so that a single physical machine entity, e.g. a PC, behaves like a set of physical entities. The virtual version can be a hardware platform, an operating system, a storage device or network resources.

Each virtual machine is provided with a CPU, RAM, hard-disks and network adapters. Virtual switches provide the connections between the virtual machines and the physical network. Different operating systems – old as well as new – will run on the same physical computer. Clients still use regular workstations and the normal physical control and client/server networks are unchanged. Common goals of virtualization projects include reducing administration tasks and improving scalability.

Server consolidation saved considerable costs

The most obvious benefit of Mälarenergi’s virtualization is the hardware optimization gained from server consolidation. ABB’s project proposal was based on greater operational redundancy and reducing the thirteen physical servers to just two, each with eight virtual servers, in two separate networks.

By reducing the amount of hardware, Mälarenergi saves on purchasing costs, related equipment costs (network switches, cabling, cabinets, etc.), space costs and power and cooling costs. Conventional servers are notorious ‘energy thieves’, with a large electricity consumption. Virtualization saves up to 50% of these costs. The working environment also benefits from greatly reduced noise levels.

Smooth, problem-free implementation

ABB has a solid footing in virtualization technology. Its solution is based on VMware vSphere ESX. VMware is the market leader in virtualization and is used in 70% to 90% of the world’s virtualized computer systems. What’s more, in contrast to other DCSs verified for server node consolidation in a virtual environment, ABB’s System 800xA was the first on the market for use in production.

With this background, it was no surprise that Mälarenergi’s virtualization-based server-consolidation project was quick and problem-free.

Ingemar Larsson, the ABB sales manager responsible for Mälarenergi, explains that the new system could be tested prior to installation. “We ran several program versions on the same computer to ensure that everything worked as expected. We could then start-up without any interruptions to plant operation.” He also says that thanks to the virtual servers, the time needed to implement the System 800xA upgrade could be kept very short. “The whole project began in June 2010 and was fully operational by October,” he says proudly. “We ran online the whole time without any disruptions whatsoever,” confirms Mälarenergi’s Börje Horsell.

New servers much more reliable

This is the first time that virtualization-based server-consolidation has been put into operation at a heating and power plant in Sweden. So far the outcome has been very positive. The servers themselves are more reliable. The risk of malfunction is greatly reduced, plus it is much easier to expand the system in the future. “If needed, Mälarenergi can make new installations on one server during operations at the same time as the second server is up and running, concludes Ingemar Larsson.”

Summary

Virtualization via System 800xA brings Mälarenergi many cost and operational benefits by simplifying how the energy-supplier manages and maintains its servers. Replacing physical servers with virtual drastically reduces hardware numbers and operating expenses, and increases availability. Software upgrades are also easier to install, promoting the wider use of advanced control technologies and functionality implicit in the company’s operating philosophy.

“We ran online the whole time without any disruptions whatsoever,” confirms Mälarenergi’s Börje Horsell.

Courtesy of: Mälarenergi, Photographer: Lasse Fredriksson

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