

## KHP implemented the infrastructure from VMware

### Main challenges:

- To reduce operative costs
- To ensure the maximum availability of information systems (SLA with business)
- To integrate the infrastructure and to simplify the administration of information systems
- To respond immediately to necessity of the company development
- To improve the recovery time of information systems
- To eliminate IT of dependence on HW (repairs), to unify manufacturers

### Solution:

- Investment in unified layer of HW in the DELL PE2950 line
- The SAN central data warehouse based on the EMC CX3-10c disk array
- The SAN infrastructure – Fibre-channel Brocade 200E
- Implementation of the VMotion technology (automatic movement of virtual server at the HW breakdown with minimum system operation)
- Consolidated Backup Implementation (backup of VMDK file of virtual servers – complete images)

“The infrastructure from VMware brings the maximum possible availability of information systems and it minimizes impacts on business in case of failure. Presently we are able to assure the operation 24/7 and we are resistant to failures in real time. Previously inconceivable emergency plans have now a real basis thanks to the ultra rapid recovery from image, namely for previously inconceivable operating costs.”

*Zdeněk Mládek – Executive Manager of Information Systems of KHP*

KHP integrates in its systems the new EPR Noris with high requirements for infrastructure. Together with these requirements, the ones for availability grow. In practice, such systems can be operated in fully backed up / clustered solution but at the expense of high costs of HW and operation. Similar approach is not necessary with the infrastructure of VMware, because the dependence on the HW layer is eliminated by insertion of the visualization layer. While previously, at implementation of new information system, we had to plan the purchase of physical HW in a complicated way and solve subsequently the manual installation, this problem is now avoided for us with VMware. At this moment, KHP is ready for immediate realization of the information system, namely without any further requirements for increasing investment in HW. At 1st January 2009 we have 18 fully virtualized servers on four physical DELL servers. So the consolidation ratio is 4.5:1.

Virtualization is the term in the period of pressure on reduction of operating costs and there is no better solution of the construction of arbitrarily large solution of the infrastructure than VMware. So KHP selected the top solution, VMware Infrastructure 3, implemented by the S&T company. The solution is structured in the HW layer as fully backed up, namely real-time. Four pillars of the VMware ESX cluster system are formed by four DELL servers – four ESX hosts. In case of failure of one of them, the VMotion component will move running virtual servers to remaining three ESX hosts, namely with minimum failure duration of several minutes. In the same way, the performance can be consolidated and the operation priority can be assigned. In the present case, the movement is required - fully controlled and the failure time is zero. If the ESX host is working to its capacity by the run of virtual servers, the virtual server will be moved to less loaded ESX host (Resource pools).

In KHP we started with the virtualization in 2004 when we began with realization of virtual servers on the emulation visualization software VMware server. VMware server was installed on two separated physical servers with the Windows 2003 Enterprise operation system and generally, till the beginning of the year 2008, we established 9 virtual servers on the VMware server. This solution helped us to reduce the growing costs but it didn't offer anything else (availability, accident plans). In 2004 KHP had seven server rooms and it was excessively demanding for the administration for reasons of maintenance, operation and human resources. At the beginning of 2008 we decided to test the VMware ESX installed on one physical DELL server with the total number of five virtual servers before migration. In September 2008 we migrated 14 running virtual servers on two different platforms of VMware. In the near future (2009) we anticipate the infrastructure consolidation in the sole data centre, placed in the main server room of the C building and two smaller server rooms in March 2009. At the end of the 2010 we anticipate the consolidation to main and secondary server room with the total number of 30 virtual servers on eight ESX hosts in the VMware cluster. It means to perform (to award to the S&T company) the analysis of the dispatching centre virtualization and the migration of applications to virtual servers.

### Why VMware?

- Lower power consumption by physical servers, as well by the air conditioner and lower emissions of CO<sub>2</sub>
- Easy administration – lower number of people – lower costs
- Disaster Recovery: smooth switchover to new HW in case of a breakdown – elimination of the dependence on HW, easy and rapid recovery of information systems. VMware eliminates the necessity of the backup solution (the HW backup).

- Very rapid link-up of new information systems – less than one hour. Easy provisioning of new applications: preparation of new server from the template is the question of minutes
- Maximum exploitation of HW means – the remaining potential can be always used and it is not necessary to purchase new HW
- Maximization of the server / Watt ratio, namely of the solution price ratio

“With anticipation of further growth of the company, KHP would be threatened by increasing costs of operation of information systems. KHP would have intolerably high costs of administration of systems and of energy. Requirements for space would increase and the number of servers would increase unreasonably” says Mr. Zdeněk Mládek, the IT KHP manager.

#### **Course of implementation on the virtual infrastructure in KHP**

“It helped us very much to invest our time in the operation planning. The actual migration in September 2008 passed exactly according to plan in cooperation with the service supplier, the S&T company, in week cycles with planned down times of production applications. Cooperation was trouble-free, during five weeks we had built a quite new modern infrastructure. In the list of activities it concerned: networking of the central server room, HW installation (servers, disk array), movement of servers and UPS from separated server rooms and the actual migration of virtual servers with involvement in the production.”

#### **Why should be VMware virtualization also considered by other companies of the Veolia group?**

“Operation of physical servers is demanding for the administration and TCO (total cost of ownership) is higher up to 90 % than of virtual ones. In addition to that, each IT manager must respect the mean time between system failures and take the failure into account (loss in CZK for one minute of failure). At VMware the BIA values are profoundly different from other infrastructure solution.”

#### **Financial benefit of VMware for KHP and results achieved in 2008:**

- Estimated return on initial investment: 15 months
- Estimated saving of TCO in direct costs: CZK 1.9 million and in indirect costs: CZK 1 million for three years
- Estimated return on investment - ROI (Return on Investment) – 155 % (for three years)
- Consolidation ratio 4.5:1
- Saving of space in server rooms, reduction of the number (from 7 to 3 respectively 2), saving of the number and power demand of the air conditioner 6kW, saving of maintenance service of the air conditioner
- Saving of the HP support for out-of-service servers, saving of the after-guarantee support for planned servers. High-quality consolidated data centre with redundant air conditioner
- High availability
- Ease of maintenance
  - Centralized administration
  - In case of irretrievable system error the rapid recovery from backup image
  - SAN backup

#### **Virtualized applications:**

- Attendance
- SMS
- TRM1, 2, 3
- Plone
- ZIS (backup)
- Fleetware
- Proxy 2
- Noris AP
- Noris DB
- MOM

#### **Plan for 2009-2010 of virtualized applications:**

- HR/HS/NS – 3x domain controller (2009)
- ZIS (2009)
- GIS (2010)
- Servers in dispatching centre

#### **HW plan 2009–2010:**

- 2x DELL PE 2950 (8 CPU cores) – 2009
- 2x DELL PE 2950 (12/16 CPU cores) – 2010
- 10xHDD 500GB (2009)

#### **Technical details:**

- DELL PE 2950, 2xCPU (QuadCore), 16GB RAM, HBA FC 2port
- SAN EMC CX3-10c 6HDD FC Raid5 4HDD FC Raid1+0
- Brocade 200E, 8port
- Modern server room with dual air conditioning and environmental sensors