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IMPLEMENTATION OF HIGHLY AVAILABLE IT SYSTEM INFRASTRUCTURE USING VIRTUALIZATION TECHNOLOGIES

Adnan Strojil, dipl.ing.el.
IPI
Fakultetska 1, Zenica
Bosnia and Herzegovina

Senad Uka
IPI
Fakultetska 1, Zenica
Bosnia and Herzegovina

ABSTRACT
In developing environments where customer expectations cannot be predicted, and where every desired software or system feature must be agile solved it is very important to design proper stable, scalable, highly available system infrastructure which integrity cannot be compromised. Opposite that hardware and network technologies, by the time are doing remarkable progress offering us a solution for such problems. Obstacle might be final system complicity, which is not easy to design, install and maintain.
This paper explains virtualization as one of the possible solutions for managing customer needs, hardware requirements and system integration in one simple, scalable, highly available and reliable system concept. It gives main guidelines how to size and design possible Information system based on virtual hardware infrastructure.
Keywords: IT, System Infrastructure, Virtualization, Virtual server, Resource Consolidation, Virtual Hardware Infrastructure

1. INTRODUCTION
Planning the hardware infrastructure to meet high availability and scalability requirements before the production phase of the software can be very hard task since the bottlenecks and real world problems cannot be accurately predicted.

Agile software development model demands infrastructure that supports the iterative nature of the process. Such hardware infrastructure must be adaptable for the fast pace of changes and improvement while keeping in mind the costs of hardware reconfiguration.

Another problem that hardware infrastructure designers face is the difficulty of explaining the added costs of high availability to the non-technical subjects in the business decision making process. Virtualization technologies can help solving some of these problems in the majority of cases.

2. CONSIDERATIONS AND PROBLEMS OF HARDWARE INFRASTRUCTURE DESIGN

2.1. Development and deployment process considerations
In the planning phase of the project it is necessary to try to roughly predict the parameters that can affect the choice of the hardware platform and their influence to the high availability of the

information system in the production phase. It is a good practice to, alongside the road map of the software project, build a road map of the hardware infrastructure development with costs and high availability requirements milestones included.

In the development and testing phase of the project high availability is not crucial. Hardware infrastructure should be dimensioned according to needs and provide only the base for testing of the software. Also, it is very important to understand the concepts of virtualization.

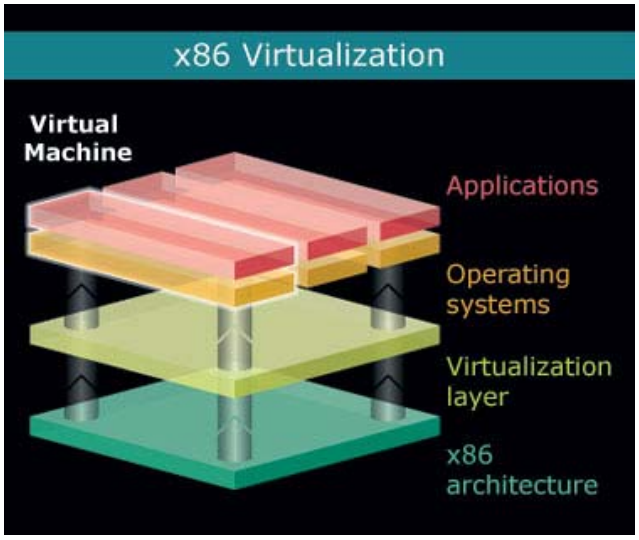

Figure 1. Virtualization concept layered for commodity x86 architecture.

At the time software enters the production phase the hardware infrastructure must be ready for the planned availability level.

2.2. Costs considerations

Since the system gradually develops the best thing is to expand the hardware infrastructure by protecting the investment path. It is possible to divide the investments into hardware so that basic functionality requirements are met at the beginning and that the following investments add to the availability.

2.3. Requirements change problem

As the software starts to take its form, usually the customer will have additional ideas about what it should do or how should it behave. Often the implementation of those new requirements includes the change of the hardware infrastructure in form of adding resources, logical organization change etc.

After the business logic had been completely supported in the software – the availability and scalability requirements my change directly affecting the hardware infrastructure.

2.4. Explaining the costs and benefits of high availability to the non-technical audience

By requirements of the customer, services served by software must require specific quality of service. Depending of that parameter it is very important to project that type of requirements to proper hardware infrastructure. High availability in hardware platform can be provided by simple redundancy techniques, as a most common technique. That means that each component of hardware infrastructure must be at least doubled and that each component must have its own real time failover component.

As it is well known in IT, for any purpose in professional business hardware platform is mostly constructed of the high quality components that are very expensive based on two reasons: they are not commodity class so they are not made as a mass product and must carefully pass each performance and quality test. Easily, conclusion can be drawn that every high availability system requires hardware infrastructure that is very expensive no matter of its performance. Additionally performance can be upgraded by additional hardware.

As semiconducting technology scores remarkable prospect, even in commodity class hardware it is very hard to find low performance components. Moreover, hardware vendors are producing components that in most cases, even with business purposes are not required and it is questionable will they be needed in future. By comparison of hardware requirements in business processes, once hardware infrastructure is installed, its performance can serve many additional processes besides the main process. That means, in concept of virtualization that if we split hardware "power" to multiples and dedicate it for some virtual machines, single high availability infrastructure can be used for more virtual machines.

As the memory and processor usage in most of operative systems in business environments is constant in specific periods during the day, it is easy to plan whole system performance and interleaving of available resources and real hardware requirements in specific time slots.

Figure 2. Multiple servers can be installed on single high availability hardware infrastructure decreasing initial and energy costs.

3. VIRTUALIZATION SOLUTIONS AND IMPLEMENTATION OBSTACLES

As virtualization concept offers cost decreasing solution for most business information systems, it also causes different administration and installation complications.

3.1. Virtualization solutions

Most of the companies that are running their information systems on different class servers are facing the scalability problem. As high availability is specific requirement it is very reasonable to think about its scalability. Initial costs for highly available and scalable system are more expensive than only highly available, but as company requirements grow, we are running to conclusion that TOC (Total Cost of Ownership) factor is rapidly growing (including costs of power consumption, installation costs, administration costs, hardware resources reconsolidation…)

3.2 Virtualization obstacles

Virtualization might offer cost effective solutions for most of business high availability problems, though during the planning it as a solution, it is important to understand possible obstacles. Though virtualized systems are very easy to administrate remotely, administrators must be fully qualified for that part of job. Small administrator mistakes can cause short system failure, which is opposite to high availability concept. It requires careful design process and implementation planning. If mistake is made during this processes, faults can be corrected but they will cause system interruptions which qualifies system as non high available.

6. CONCLUSION

As semiconducting technology is making remarkable process, and customer infrastructure needs are growing it is reasonable to try to find proper cost effective, scalable hardware solution. Virtualization is option for most of business that require high availability infrastructure systems. Using virtualization techniques it is easy to administrate complete system and it allows smaller number of system engineers, though they need to be fully trained and professional. As virtualization does decrease some of hardware performance due virtual machine administration, this concept of high availability is not ad hoc acceptable that require significant server resources. Therefore, planning of highly available hardware infrastructure requires careful approach and analysis.

7. REFERENCES

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