

Management the Development and Testing of Systems of Forecasting Changes of the Chemical Composition of the Atmosphere

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Abstract: Living standards in the industrial cities is determined by many parameters, one of which is the environmental situation of human living space. When evaluating the ecological state of the environment can be called the dominant change in the chemical composition of the atmosphere. Providing a healthy ecological conditions related research priorities of interdisciplinary specialists. To do this, you want to create human-machine interfaces for interoperability specialists from different direction: the developer of mathematical models, tracking and analysis of heterogeneous information from the field of meteorology, atmospheric chemistry, medicine and health services for assessment of the situation in the industrial areas and making decisions not favorable situations.

A functioning system of ecological monitoring of the industrial city of Ust-Kamenogorsk consists of a set of application with different formats, which requires the solution of the problem for the development of the format of the application of the basic elements of the container system and the organization of the database and access it from a problem-oriented application.

To solve this problem in the way decisions are given, a comparative analysis of possible approaches and methods, as well as modern principles of application. We describe the classification of containerization and overview of modern technologies to improve the efficiency of interaction of interdisciplinary teams to solve the tasks of monitoring and forecasting chemical weather. Application results can be used to control the development and testing of the system predict the chemical composition of the atmosphere changes.

1. Introduction

In solving environmental monitoring problems, as well as in the evaluation of the ecological state of the environment, requires create a complex software product, which takes into account all the factors of ecological conditions of contemporary society and providing operational data of the specialists from different spheres for decision-

making. This requires to create multiple applications or subsystems in a single system, the decisive in turn a certain tasks, but in the complex meet all the requirements of different users. However, when you create multiple applications, there is the task of developing a common format of the application for further efficient data management.

For the city of Ust-Kamenogorsk functions environmental monitoring system consisting of a set of applications with different formats as shown in Figure 1, which requires isolation of applications and the development of the format for the base of the container system and the organization of the database (DB) and access to DB.

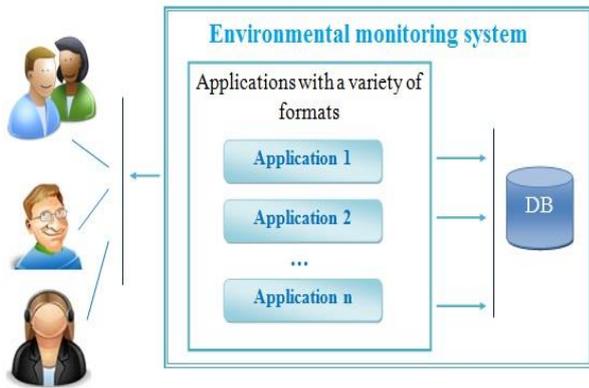


Figure 1. Structure of the system.

2. Proposed Techniques

Isolation Techniques are shown in Figure 2.

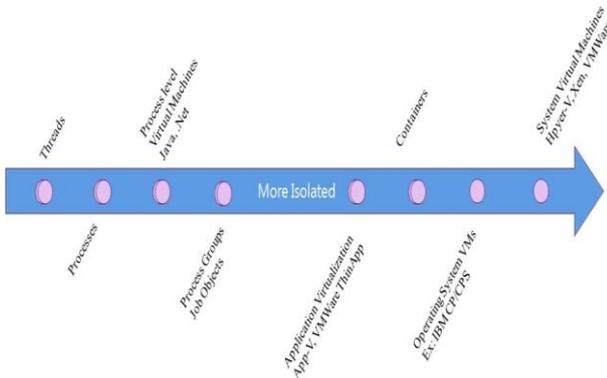


Figure 2. Isolation technique.

In connection with the development of technology to solve these problems, you can use technologies such as virtualization and containerization. Application virtualization forms several independently operating applications (with context) or custom views (terminal sessions, user profiles) [2].

The main purpose: to separate applications from the operating system, making them mobile and provide an opportunity for the execution of applications in different environments. Containerization – applications can be broken down into manageable

functional components, individually packaged together with all its dependencies and then easily deployed to a non-standard architecture. Multiple isolated systems are run on a single control host and access a single kernel.

Thus, the general scheme of the virtualization and containerization can be shown in Figures 3.

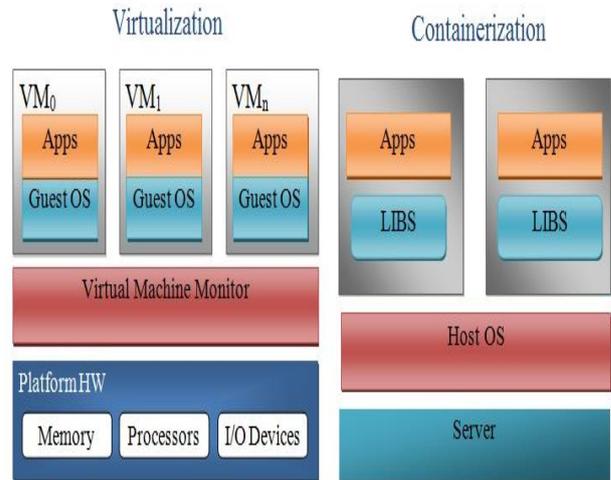


Figure 3. Virtualization technology and containerization.

Analysis of some technologies for implementing virtual environments shown in Table 1.

Table 1. Technologies for the implementation of virtual environments.

Technology	Isolation	Supported client operating systems
KVM	full virtualization	Linux, Windows, FreeBSD
Xen	para/ full virtualization	Linux, Windows, FreeBSD
Linux vServer	os-level virtualization, containerization	Linux only
OpenVZ	os-level virtualization, containerization	Linux only
Linux Containers, LXC	os-level virtualization, containerization	Linux only

Figure 4 shows an example for KVM technology. KVM – free open source software for hardware-assisted virtualization [3-4].

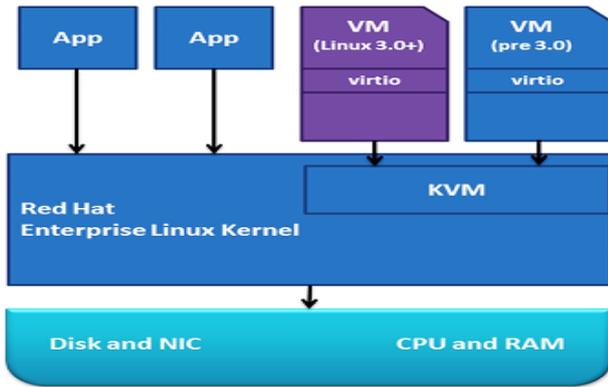


Figure 4. Example KVM.

The main advantages of virtualization include: increased insulation; security; distribution of resources; constant availability; improving the quality of administration. Disadvantages: the requirement of additional hardware resources, some platforms of the virtualization exacting to the specific hardware, price.

When containerization of the applications, can see a different scheme as shown in Figure 5.

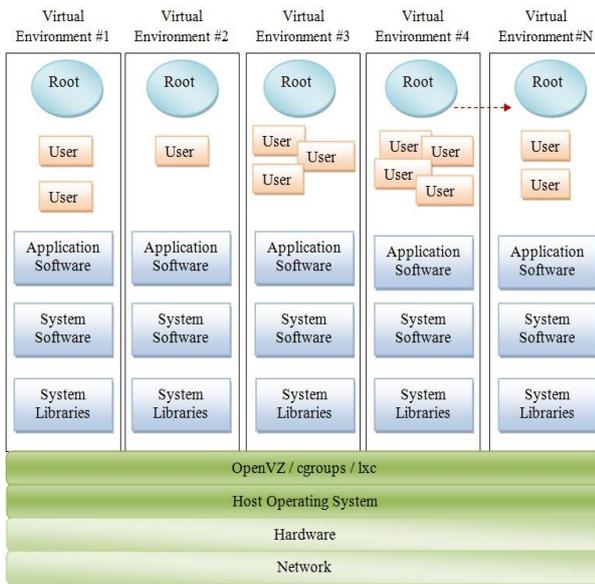


Figure 5. Containerization of the applications.

The main advantages of containerization: deployed as multi-tier distributed apps; powerful abstraction for micro services; familiar deployment models; higher utilization and compute density; rapid scale-up/scale down and less overhead. The disadvantages of this technology: the containers share the kernel OS - this means that they are limited to the same architecture, and if they are resource-intensive applications. Containers compared to virtual machines run much faster,

since there is no need to load the operating system, just need to run the application [5-7].

3. Results and Discussion

Result of the research of existing technologies, methods and approaches for management this system has shown, that this problem suitable containerization technology for effectively solve the tasks of professionals from different spheres.

4. Conclusions

So in general, if want package and distribute your application as components, application containers serve as a good technology.

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