USER CENTRIC SECURITY AND DEPENDABILITY IN THE CLOUDS-OF-CLOUDS

Cloud architecture has displayed its importance in the IT industry in an extremely loud and sound manner. It can be employed in any environment where computers can have their presence. But the high expense and the disaster recovery requirements require a very high cost which is becoming a hurdle for success of cloud infrastructure.

The required solutions provided are-:

1. Lower end-to-end latency due to fine-grained geodistribution.
2. Lower cost by choosing best of breed available cloud infrastructure.
3. Improved resilience to avoid wide-range outages due to single point of failure.

The collective earlier proposed solution was the distributed cloud model which remained unsuccessful because of its very high complexity, proprietary, and the lack of inter-operability. In practice, this model has remained much of provider-centric and multicloud seems to be a challenge. So, this demands a new solution to the prevailing problems.

In this article, a new term of **Supercloud** infrastructure is introduced. It follows the vision of user-centric model and dependability management. Supercloud can also be called as a U-cloud. Supercloud addresses the interoperability challenge by providing a resource abstraction layer spanning multiple cloud providers, decoupling resource production by cloud providers from their consumption by their users. Supercloud uniquely separates cloud resource and cloud resource production which is how it manages to overcome the vendor lock in. In a nutshell, supercloud is a provider-agnostic distributed virtualisation infrastructure for running U-clouds.

Clouds-of-clouds comes into act when customers are enabled to deploy clouds with self-service security raging from software as a service to infrastructure as a service, independent of the providers.

This project is developed on two models-:

1. Static model- this model includes the basic components of the model. The infrastructure allows the user to instantiate the U-cloud that run on the underlying infrastructure. It contains three separate abstract lanes, each addressing a particular aspect of the supercloud system. Three planes are as described below-:

a. Compute plane-: this enables users to instantiate computational nodes regardless of physical servers hosting computations.
b. Data plane-: this plane realizes the abstract cloud storage infrastructure transparent to service providers.
c. Network plane-:it provides connectivity between the computational and storage resources regardless of the networking infrastructure realising the need of physical connectivity between server hosting computational nodes and data storage.

2. Dynamic model-: This model shows the interactions between the various components of this infrastructure which ensures the high level of security. Supercloud users interact through four interfaces to deploy their applications in cloud.
   The network plane interface, typically the network hypervisor, interacts with the SDN controller and network proxies, hosted in the NVM*s* machines, to handle communication and establish secure tunnels with other clouds. The data plane interface, typically storage proxies, interacts with the providers' DVM*s* VMs to ensure access to the user's private data. The compute plane interface, typically the L1 hypervisor, interacts with providers' VM*s* machines to provide memory and CPU resources.

Supercloud has been used in many spheres of IT industry but two of its highlighted uses are-:

1. Hospital Imaging Archive-: Hospitals can store their clinical data as well as their imaging studies in on-premises private cloud storage. Archiving in the cloud helps simplify the data management and hospital archive infrastructure— especially due to high-volume imaging studies that are often as large as 1 GB. Since on-premises storage can be limited, it makes sense to store this data securely in public cloud storage. For example, a hospital might store data from the last six months in the private cloud's on-premises storage, while storing older data (10 years or more) in the public cloud.
2. Innovative Schooling System-: Schools have already adopted to the smart class system so they have already taken the first step to their journey to supercloud application. What new is to be implemented is that if a lecture or presentation uploaded on the server goes wrong so on spot correction becomes possible because multicloud has been applied to help you in this scenario. This would help high, efficient and accurate storage systems.

Supercloud have been implemented to a lot of places to achieve the pros and cons of the project as soon as possible because a better impact of this project is very necessary for the long life of cloud infrastructure. The solution is right now in an advanced stage of its application. Several results of this project are already available on- https://supercloud-project.eu/publications-deliverables. Preliminary solutions have shown the importance of this project, However, more and more developments are still going on this project and several other derivations are on the way of integration with the prevailing model. Next step is to validate the approach through testbed integration.