

Architecture of Resource Manager for Software-Defined IT Infrastructure

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The concept of Information-as-a-Service (InfaaS) is a critical concept for disaster management applications. In the disaster management, the flow of information and the synchronization of data between different sites must be maintained to facilitate the decision making process. Thus, in order for everyone involved to see the same information at the same time, an application is needed to visualize different types of data and synchronize the information among different sites. The visualization system requires an IT Infrastructure that can compensate partial lacks of components and can adapt to suddenly changing environments caused by a disaster. As a technology that satisfies these requirements, we have focused on Software-Defined techniques that is to flexibly control a system by software. Software-Defined techniques have potential to bring the functionalities of the needed flexibility and resilience to existing IT Infrastructures. Therefore, we have been studying and developing the Software-Defined IT Infrastructure technology to realize a distributed visualization system for disaster management applications.

The distributed visualization system with the Software-Defined IT Infrastructure is composed of three components: servers to visualize various data, large-scale display systems for presenting information to users such as Tiled Display Wall and network for connecting among sites. These components need to sustain their functionalities even when they are suffered by a disaster. When a disaster makes a certain site inoperable, it is necessary to migrate the resources, servers and the large-scale display systems, running on the site to another site that did not suffer a disaster. Moreover, network connections have to be reconfigured for connecting to the migrated resources. In order to build a system with the functionalities, we have adopted two technologies in our distributed visualization system with the Software-Defined IT Infrastructure. For the purpose of facilitating migrate and deploy, the servers are virtualized by Docker. In order to be reconfigured easily, the network is constructed as an overlay network by Software-Defined Networking (SDN). SDN simplified the logical configuration change of the network by supervising the dataflow.

Currently, such components have behaved independently. However, for appropriately performing the functionalities for various situation caused by a disaster, it is essential to link each the components mutually. The servers are necessary to control migrating and deploying in consideration from availability of each the sites. The overlay network need to be set to maintain dataflow by an SDN controller, which is software that acts as a dataflow control point in the SDN. Therefore, a resource manager dealing with behavior of these components comprehensively is required. In this poster, we show an architecture of the resource manager for building the distributed visualization system with Software-Defined IT Infrastructure applied.

Keywords: Software-Defined IT infrastructure, resource manager, disaster management application, InfaaS

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