such as servers and edges, and one or more virtual nodes run in each physical node. For example, an operation such as arranging a new application on a virtual node is performed so that a service is available on a device (e.g., an IoT (Internet of Things) device) connected to a physical node. However, conventional application arranging control techniques such as a container do not consider a location of the physical node, a network connection configuration of a network connecting the device to the physical node, quality of the network, and the like. Therefore, depending on the location of the application, there may be a problem of service quality degradation such as a failure of satisfying an SLA (Service Level Agreement; e.g., delay condition) of the service already provided by the distributed system.

[0005]

In view of the background described above, it is an object of the present invention to solve a problem of preventing the service quality degradation considering at least any one item among the location of the physical node, the SLA, the network connection configuration of the network connecting the device and the physical node, and the quality of the network in the distributed system.

SOLUTION TO PROBLEM

[0006]

In order to solve the problems described above, a first aspect of the present invention provides an ICT resource management device that manages a physical node and a virtual node as ICT resources, includes: a configuration information management part configured to manage physical layer configuration information that is information on a configuration of the physical node on a physical layer and virtual layer configuration information that is information on a configuration of the virtual node on a virtual layer; a layer mapping part configured to perform mapping between the physical layer and the virtual layer; a location specifying part that specifies a location of the physical node included in the physical layer configuration information; a first device connect destination determination part that determines a physical node that is to be a connection destination to which a device utilizing a service is to be connected, in response to a request for configuration change regarding the connection of the device utilizing the service to the physical node, based on at least any one of the ~~specified~~ location specified, service management information that is managed as information on the service, a network connection configuration of ~~the~~ a network connecting the

device to the physical node, and quality of the network in response to a request for configuration change regarding a connection of the device utilizing the service to the physical node; a blueprint creation part configured to create a blueprint in response to the request for the configuration change, which blueprint is design information on an infrastructure required for the configuration change and is based on the physical layer configuration information, the virtual layer configuration information, mapping information that is information obtained as a result of the mapping, and the connection destination; and an orchestrator part configured to perform orchestration of the virtual layer based on the blueprint by accessing and running a program that is operable via ~~an~~ a southbound API, wherein the service management information includes information about an application utilized for the service and about an operating ICT resource containing an identifier of the ICT resource that operates when a target service is provided.

[0007]

According to a third aspect of the invention, an ICT resource management method in an ICT resource management device that manages a physical node and a virtual node as ICT resources, includes steps of: managing physical layer configuration information that is information on a configuration of the physical node on a physical layer and virtual layer configuration information that is information on a configuration of the virtual node on a virtual layer; performing mapping between the physical layer and the virtual layer; specifying a location of the physical node included in the physical layer configuration information; determining a physical node that is to be a connection destination to which a device utilizing a service is to be connected, in response to a request for configuration change regarding the connection of the device utilizing the service to the physical node, based on at least any one of the ~~specified~~ location specified, service management information that is managed as information on the service, a network connection configuration of ~~the~~ a network connecting the device to the physical node, and quality of the network in response to a request for configuration change regarding a connection of the device utilizing the service to the physical node; creating a blueprint in response to the request for the configuration change, which blueprint is design information on an infrastructure required for the configuration change and is based on the physical layer configuration information, the virtual layer configuration information, mapping information that is information obtained as a result of the mapping, and the connection destination ~~information~~; and performing orchestration of the virtual layer based on the blueprint by accessing and running a program that is operable via ~~an~~ a southbound API, wherein the service management information

includes information about an application utilized for the service and about an operating ICT resource containing an identifier of the ICT resource that operates when a target service is provided.

[0008]

According to a first and third aspects of the invention, an optimum connection destination of the device can be determined to satisfy the service SLA.

Therefore, the degradation of the quality of service for the operation

CLAIMS

1. An ICT resource management device that manages a physical node and a virtual node as ICT resources, the ICT resource management device comprising:

a configuration information management part configured to manage physical layer configuration information that is information on a configuration of the physical node on a physical layer and virtual layer configuration information that is information on a configuration of the virtual node on a virtual layer;

a layer mapping part configured to perform mapping between the physical layer and the virtual layer;

a location specifying part that specifies a location of the physical node included in the physical layer configuration information;

a first device connect destination determination part that determines a physical node that is to be a connection destination to which a device utilizing a service is to be connected, based on at least any one of the ~~specified~~ location specified, service management information that is managed as information on the service, a network connection configuration of ~~the~~ a network connecting the device to the physical node, and quality of the network in response to a request for configuration change regarding ~~the~~ a connection of the device utilizing the service to the physical node;

a blueprint creation part configured to create a blueprint in response to the request for the configuration change, which blueprint is design information on an infrastructure required for the configuration change, based on the physical layer configuration information, the virtual layer configuration information, mapping information that is information obtained as a result of the mapping, and the connection destination; and

an orchestrator part configured to access and run a program that is operable via ~~an~~ a southbound API, based on the blueprint, to thereby perform orchestration to the virtual layer,

wherein the service management information includes information about an application utilized for the service and about an operating ICT resource containing an identifier of the ICT resource that operates when a target service is provided.

2. The ICT resource management device according to claim 1, comprising a second device connect destination determination part in place of the first device connect destination determination part, the second device connect destination determination part determining a physical node that is to be a connection destination to which a device utilizing a service is to be connected, based on at least any one of the location specified, a relative distance of the physical node to

the device utilizing the service, information on the service that is managed as service management information, a network connection configuration of the network connecting the device to the physical node, and quality of the network in response to a request for configuration change regarding the connection of the device utilizing the service to the physical node.

~~2~~3. The ICT resource management device according to claim 1 or claim 2, wherein the connection destination includes a movable physical node.

~~3~~4. An ICT resource management method in an ICT resource management device that manages a physical node and a virtual node as ICT resources, the ICT resource management method comprising steps of:

managing physical layer configuration information that is information on a configuration of the physical node on a physical layer and virtual layer configuration information that is information on a configuration of the virtual node on a virtual layer;

performing mapping between the physical layer and the virtual layer;

specifying a location of the physical node included in the physical layer configuration information;

determining a physical node that is to be a connection destination to which a device utilizing a service is to be connected, based on at least any one of the ~~specified~~ location specified, service management information that is managed as information on the service, a network connection configuration of ~~the~~ a network connecting the device to the physical node, and quality of the network in response to a request for configuration change regarding ~~the~~ a connection of the device utilizing the service to the physical node;

creating a blueprint in response to the request for the configuration change, which blueprint is design information on an infrastructure required for the configuration change, based on the physical layer configuration information, the virtual layer configuration information, mapping information that is information obtained as a result of the mapping, and the connection destination ~~information~~; and

performing orchestration of the virtual layer based on the blueprint by accessing and running a program that is operable via ~~an~~ a southbound API,

wherein the service management information includes information about an application utilized for the service and about an operating ICT resource containing an identifier of the ICT resource that operates when a target service is provided.

~~4~~5. An ICT resource management program configured to cause a computer to serve as the ICT resource management device according to ~~claim 1 or claim 2~~any one of claims 1 to 3.