upgrade, kernel upgrade, energy efficiency or optimization processes, prior to node shutdown, etc. However, a scheduler in the SMO which may be responsible for instantiating network functions in the O-Cloud nodes, may not be aware that the node is being drained, and this may inadvertently cause errors if the scheduler attempts to instantiate a network function in an O-Cloud node which is being drained. Therefore, there is a need to be able to indicate that the O-Cloud node should no longer be able to be scheduled (i.e., in an unschedulable state).

SUMMARY

[0009] Aspects of the present disclosure provide a method and system for cordoning an O-Cloud node in order to mark the O-Cloud node as unschedulable. Particularly, prior to the O-Cloud node being drained, an SMO function (e.g., at least one of the FOCOM and the NFO) may request for the IMS/DMS to cordon the O-Cloud node, thereby marking it not being able to be scheduled by a scheduler of the SMO (i.e., an unschedulable state).

[0010] Accordingly, aspects of the present disclosure may avoid scheduling errors (for instance, scheduling the instantiation of a network function when the O-Cloud node is being drained).

[0011] According to an aspect, a method for cordoning one or more Open Radio Access Network (O-RAN) Cloud (O-Cloud) nodes may be provided. The method may include receiving, by a Service Management and Orchestration Framework (SMO) function , a first request to cordon at least one O-Cloud node, the first request being received from a user terminal or from an rApp of a Non-Real-Time (Non-RT) RAN Intelligent

Controller (RIC); transmitting, by the SMO function to an Infrastructure Management Services (IMS) and/or Deployment Management Services (DMS) via an O2 interface, a second request to cordon the at least one O-Cloud node

[0017] Receiving the first notification that the O-Cloud node has been cordoned may further include: receiving, from the SMO function by the rApp of the Non-RT RIC, the first notification that the at least one O-Cloud node has been cordoned.

[0018] According to another aspect, an apparatus for cordoning one or more Open Radio Access Network (O-RAN) Cloud (O-Cloud) nodes may be provided. The apparatus may include at least one memory storing computer-executable instructions; and at least one processor configured to execute computer-executable instructions to: receive, by a Service Management and Orchestration Framework (SMO) function , a first request to cordon at least one O-Cloud node, the first request being received from a user terminal or from an rApp of a Non-Real-Time (Non-RT) RAN Intelligent Controller (RIC); transmit, by the SMO function to an Infrastructure Management Services (IMS) and/or Deployment Management Services (DMS) via an O2 interface, a second request to cordon the at least one O-Cloud node based on the received first request; and receive, from the IMS/DMS, a first notification that the at least one O-Cloud node has been cordoned, wherein the SMO function is at least one of a Federated O-Cloud Orchestration and Management (FOCOM) and Network Function Orchestration (NFO).

[0019] The second request may be an instruction to cordon a first O-Cloud node of the at least one O-Cloud node, wherein the first notification indicates that the first O-Cloud node has been condoned, wherein the at least one processor may further be configured to execute the computer-executable instructions to: transmit, by the SMO function to the IMS/DMS via an O2 interface, a third request to cordon a second O-Cloud node of the at least one O-Cloud node based on the received first request; and receive, from the IMS/DMS, a second notification that the second O-Cloud node has been cordoned.

[0020] The first request may be triggered by rApp of the Non-RT RIC or by a manual request submitted via a Service Management and Orchestration Framework (SMO).

[0021] The second request may only be transmitted by the SMO function to the IMS/DMS based on determining, by the SMO function , that the first request to cordon the at least one O-Cloud node is valid.

[0022] The at least one processor may be further configured to execute the computer-executable instructions to: control, by the IMS/DMS, to cordon the at least one O-Cloud node based on the second request to mark the O-Cloud node as unschedulable.

[0023] The at least one processor may be further configured to execute the computer-executable instructions to receive the first notification that the O-Cloud node has been cordoned by: receiving, from the IMS/DMS by the SMO function via the O2 interface, the first notification that the at least one O-Cloud node has been cordoned.

[0024] The at least one processor may be further configured to execute the computer-executable instructions to receive the first notification that the O-Cloud node has been cordoned by: receiving, from the SMO function by the rApp of the Non-RT RIC, the first notification that the at least one O-Cloud node has been cordoned.

[0024a] According to yet another aspect, there may be provided a non-transitory computer-readable recording medium having recorded thereon instructions executable by at least one processor to cause the at least one processor to perform a method. The method may include: receiving, by a Service Management and Orchestration Framework (SMO) function , a first request to cordon at least one O-Cloud node, the first request being received from a user terminal or from an rApp of a Non-Real-Time (Non-RT) RAN Intelligent Controller (RIC); transmitting,

by the SMO function to an Infrastructure Management Services (IMS) and/or Deployment Management Services (DMS) via an O2 interface, a second request to cordon the at least one O-Cloud node based on the received first request; and receiving, from the IMS/DMS, a first notification that the at least one O-Cloud node has been cordoned, wherein the SMO function is at least one of a Federated O-Cloud Orchestration and Management (FOCOM) and Network Function Orchestration (NFO).

[0025] Additional aspects will be set forth in part in the description that follows and, in part, will be apparent from the description, or may be realized by practice of the presented embodiments of the disclosure.