WHAT IS CLAIMED IS:

1. An apparatus for a non-real-time radio access network intelligence controller (NRT-RIC) framework in an open radio access network (O-RAN), the apparatus comprising:

a memory storing instructions; and

at least one processor configured to implement the NRT-RIC framework of an NRT-RIC by executing the instructions to:

receive, from an rApp hosted by the NRT-RIC, a first request for retrieving a configuration schema of at least one network element in the O-RAN, the first request comprising a first R1-O1 configuration management (CM) data model identifying the at least one network element, and the first request being received via an R1 interface within the O-RAN architecture between rApps and the NRT-RIC framework; and

send, from the NRT-RIC framework to the rApp via the R1 interface, a first response to the requested configuration schema, the first response comprising a second R1-O1 CM data model identifying the at least one network element and identifying at least one CM attribute of the at least one network element,

wherein the R1 interface enables the NRT-RIC framework and the rApp to produce and consume at least one O1 interface related R1 service in the NRT-RIC.

2. The apparatus as claimed in claim 1, wherein the first R1-O1 CM data model comprises:

a message type parameter identifying a type of the first request; and

at least one network element parameter comprising a network element identifier (ID).

3. The apparatus as claimed in claim 2, wherein the second R1-O1 CM data model comprises:

a message type parameter identifying a type of the first response; and

for each of the at least one network element, a supported Information Object Class (IOC) entity parameter including one or more associated entity items identifying one or more CM attributes.

4. The apparatus as claimed in claim 1, wherein the at least one processor is further configured to execute the instructions to:

receive, from the rApp, a second request for reading configuration data of a CM attribute, among the at least one CM attribute identified in the first response, the second request comprising a third R1-O1 CM data model identifying a network element and the CM attribute, and the second request being received via the R1 interface; and

send, from the NRT-RIC framework to the rApp via the R1 interface, a second response comprising a fourth R1-O1 CM data model identifying the CM attribute in response to the second request.

5. The apparatus as claimed in claim 4, wherein the third R1-O1 CM data model comprises:

a message type parameter identifying a type of the second request;

an rApp identifier (ID) identifying the rApp;

a request identifier (ID) for the second request;

a network element parameter comprising a network element ID of the network element; and

a first name-contained IOC entity parameter including an IOC entity name and a first associated entity item identifying the CM attribute.

6. The apparatus as claimed in claim 4, wherein the fourth R1-O1 CM data model comprises:

a message type parameter identifying a type of the second response;

the rApp ID identifying the rApp;

a network element parameter comprising the network element identifier (ID);

a second name-contained IOC entity parameter including the IOC entity name and a second associated entity item identifying the CM attribute.

7. The apparatus as claimed in claim 5, wherein the second associated entity item further includes:

a CM attribute value identifying a value of the CM attribute.

8. The apparatus as claimed in claim 1, wherein the at least one processor is further configured to execute the instructions to:

receive, from the rApp, a third request for writing configuration data of a CM attribute, among the at least one CM attribute, the third request comprising a fifth R1-O1 CM data model identifying a network element and the CM attribute, and the third request being received via the R1 interface; and

send, from the NRT-RIC framework to the rApp via the R1 interface, a third response comprising a sixth R1-O1 CM data model for identifying the CM attribute modified in response to the third request.

9. The apparatus as claimed in claim 8, wherein the fifth R1-O1 CM data model comprises:

a message type parameter identifying a type of the third request;

an rApp ID identifying the rApp;

a network element parameter comprising a network element identifier (ID) of the network element;

a third name-contained IOC entity parameter including an IOC entity name and a third associated entity item identifying the CM attribute to be modified in response to the third request.

10. The apparatus as claimed in claim 8, wherein the sixth R1-O1 CM data model comprises:

a message type parameter identifying a type of the third response;

the rApp ID;

a network element parameter comprising the network element identifier (ID);

an attribute status acknowledging the configuration status; and

a fourth name-contained IOC entity parameter including the IOC entity name and a fourth associated entity item identifying the CM attribute and a status of the writing.

11. The apparatus as claimed in claim 10, wherein, based on the writing not being accepted, the fourth associated entity item further includes:

a Cause parameter identifying a cause of the writing not being accepted.

12. A method for a non-real-time radio access network intelligence controller (NRT-RIC) framework in an open radio access network (O- RAN), the method comprising:

receiving, from an rApp hosted by an NRT-RIC, a first request for retrieving a configuration schema of at least one network element in the O-RAN, the first request comprising a first R1-O1 CM data model identifying the at least one network element, and the first request being received via an R1 interface within the O-RAN architecture between rApps and the NRT-RIC framework; and

sending, from the NRT-RIC framework to the rApp via the R1 interface, a first response to the requested configuration schema, the first response comprising a second R1-O1 CM data model identifying the at least one network element and identifying at least one configuration management (CM) attribute of the at least one network element,

wherein the R1 interface enables the NRT-RIC framework and the rApp to produce and consume at least one O1 interface related R1 service in the NRT-RIC.

13. The method s as claimed in claim 12, wherein the first R1-O1 CM data model comprises:

a message type parameter identifying a type of the first request; and

at least one network element parameter comprising a network element identifier (ID).

14. The method as claimed in claim 12, wherein the second R1-O1 CM data model comprises:

a message type parameter identifying a type of the first response; and

for each of the at least one network element, a supported Information Object Class (IOC) entity parameter including one or more associated entity items identifying one or more CM attributes.

15. The method as claimed in claim 12, wherein the method further comprises:

receiving, from the rApp, a second request for reading configuration data of a CM attribute, among the at least one CM attribute identified in the first response, the second request comprising a third R1-O1 CM data model identifying a network element and the CM attribute, and the second request being received via the R1 interface; and

sending, from the NRT-RIC framework to the rApp via the R1 interface, a second response comprising a fourth R1-O1 CM data model identifying the CM attribute in response to the second request.

16. The method as claimed in claim 12, wherein the method further comprises :

receiving, from the rApp, a third request for writing configuration data of a CM attribute, among the at least one CM attribute, the third request comprising a fifth R1-O1 CM data model identifying a network element and the CM attribute, and the third request being received via the R1 interface; and

sending, from the NRT-RIC framework to the rApp via the R1 interface, a third response comprising a sixth R1-O1 CM data model for identifying a CM attribute to be modified in response to the third request.

17. A non-transitory computer-readable recording medium having recorded thereon instructions executable by at least one processor configured to perform a method for a non-real-time radio access network intelligence controller (NRT-RIC) framework in an open radio access network (O- RAN), the method comprising:

receiving, from an rApp hosted by an NRT-RIC, a first request for retrieving a configuration schema of at least one network element in the O-RAN, the first request comprising a first R1-O1 CM data model identifying the at least one network element, and the first request being received via an R1 interface within the O-RAN architecture between rApps and the NRT-RIC framework; and

sending, from the NRT-RIC framework to the rApp via the R1 interface, a first response to the requested configuration schema, the first response comprising a second R1-O1 CM data model identifying the at least one network element and identifying at least one configuration management (CM) attribute of the at least one network element,

wherein the R1 interface enables the NRT-RIC framework and the rApp to produce and consume at least one O1 interface related R1 service in the NRT-RIC.

18. The non-transitory computer-readable as claimed in claim 17, wherein the method further comprises:

receiving, from the rApp, a second request for reading configuration data of a CM attribute, among the at least one CM attribute identified in the first response, the second request comprising a third R1-O1 CM data model identifying a network element and the CM attribute, and the second request being received via the R1 interface; and

sending, from the NRT-RIC framework to the rApp via the R1 interface, a second response comprising a fourth R1-O1 CM data model identifying the CM attribute in response to the second request.

19. The non-transitory computer-readable as claimed in claim 17, wherein the method further comprising:

receiving, from the rApp, a third request for writing configuration data of a CM attribute, among the at least one CM attribute, the third request comprising a fifth R1-O1 CM data model identifying a network element and the CM attribute, and the third request being received via the R1 interface; and

sending, from the NRT-RIC framework to the rApp via the R1 interface, a third response comprising a sixth R1-O1 CM data model for identifying a CM attribute to be modified in response to the third request.