

Agenda Item: 15.3

Source: Motorola

Title: Resource Status Indication message contents update and
Introduction of Shutdown Complete Indication message

Document for: Decision

1 Introduction

The Resource Status Indication procedure was introduced into the NBAP procedures in the RAN WG3 meeting #6. This paper proposes replacing the Block Resource procedure with the Status Indication procedure. The Resource Administrative State element is added to the Resource Status Indication message structure and a new Shutdown Complete Indication message is introduced to the procedure.

The paper is organised as follows: Section 2.1 discusses the addition of the Resource Administrative State to the Resource Status Indication message. Section 2.2 discusses the usage and message structure of the new Shutdown Complete Indication message. Section 3 contains examples of the Resource Status Indication procedure when used to indicate a change in Resource Administrative State. Section 4 contains the proposal for decision. Reference documents are given in section 5.

2 Discussion

2.1 Resource Status Indication Message

The Resource Status Indication procedure is currently used to indicate to the CRNC a change in the state of a logical resource at the Node B due to a failure. This procedure could be extended to indicate a state change as a result of an O&M action. A new information element, Resource Administrative State, added to the Resource Status Indication message would indicate the administrative state set by the O&M entity. As a result, the Block Resource procedure becomes redundant and can be replaced by the Resource Status Indication procedure.

The message structure of the Resource Status Indication Message, taken from reference [3], is shown below with the addition of the new information element. A list of possible values for the Resource Administrative State is also shown below in Note (1).

| Information Element | Reference | Type |
|--|------------------|-------------|
| Message Discriminator | | M |
| Message Type | | M |
| Indication Type | | O |
| Resource Impact | | C |
| Cause | | O |
| Transaction ID | | M |
| Local Cell ID | | O |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |

| | | |
|--|--|----------|
| Service Impact Level | | M |
| Cell ID | | O |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |
| Service Impact Level | | M |
| Cell Carrier ID | | C |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |
| Service Impact Level | | M |
| Communication Control Port ID | | O |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |
| Service Impact Level | | M |
| BCH ID | | O |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |
| Service Impact Level | | M |
| PCH ID | | O |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |
| Service Impact Level | | M |
| FACH ID | | O |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |
| Service Impact Level | | M |
| RACH ID | | O |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |
| Service Impact Level | | M |
| DSCH ID | | O |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |
| Service Impact Level | | M |
| USCH ID | | O |
| Resource Operational State | | M |
| <u>Resource Administrative State</u> (1) | | <u>M</u> |
| Service Impact Level | | M |

(1) The Resource Administrative State is used to indicate the current administrative state of the associated resource. The Resource Administrative State can have the following values (reference [2]).

1. Unlock
2. Lock
3. Shut Down

It should be considered that a single Resource Status Indication may be used to specify multiple logical resources and not just a single resource. Consider a logical resource with related child resources. If the Node B sends indication of an administrative state change and only the parent resource is specified in the indication, the CRNC must determine what child resources are affected and the new state of the child resources. For example, if the parent resource is to be shutdown, upon completion of the shutdown, in what state are the child resources?

By explicitly listing the parent and any child resources in a Resource Status Indication, the CRNC need not make any assumptions as to the child resources affected by the state change nor to the state of these child resources.

2.2 Shutdown Complete Indication

The Shutdown Complete Indication is sent by the CRNC in response to a Node B Resource Status Indication message with a Resource Administrative State of Shut Down. It indicates that the requested logical resource has been cleared of all traffic and can now be made unavailable. The Node B on receipt of the indication will set the administrative state of the resource to Locked.

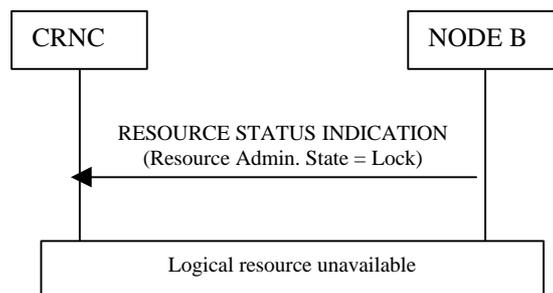
The message elements of the Shutdown Complete Indication are as follows:

| Information Element | Reference | Type |
|-----------------------|-----------|------|
| Message Discriminator | | M |
| Message Type | | M |
| Transaction ID | | M |

3 Examples of usage of Resource Status Indication Message

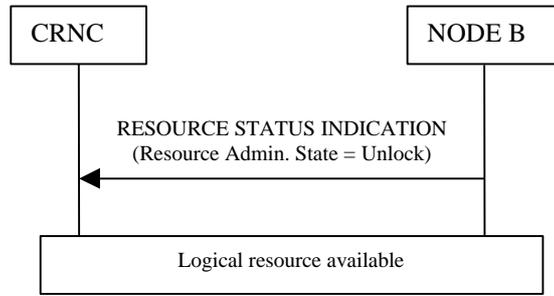
3.1 Lock

A Resource Status Indication message with the Resource Administrative State set to Lock is sent to the CRNC when a lock resource command is initiated from the Node B management system to make the resource unavailable. The figure below indicates the message flow.



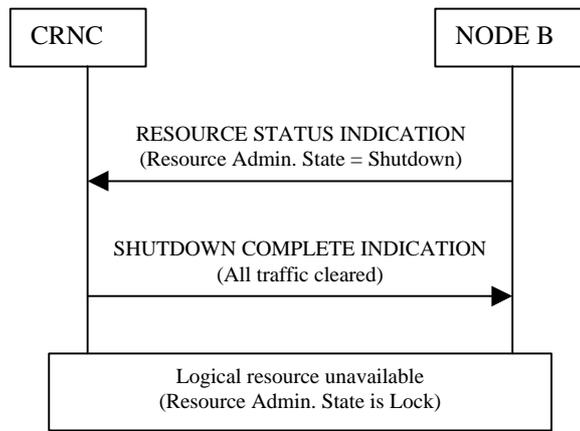
3.2 Unlock

A Resource Status Indication message with the Resource Administrative State set to Unlock is sent to the CRNC when an unlock resource command is initiated from the Node B management system to make the resource available at the Node B. The figure below indicates the message flow.



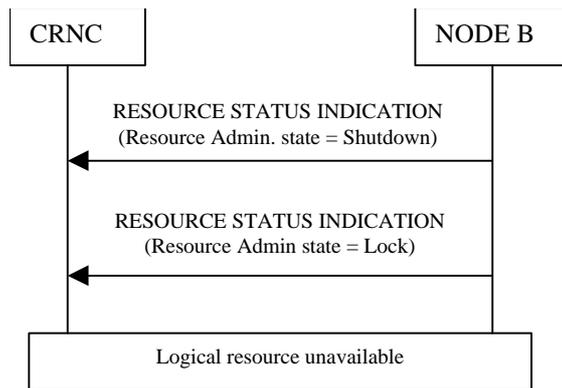
3.3 Shutdown

A Resource Status Indication message with the Resource Administrative State set to Shutdown is sent to the CRNC when a shutdown resource command is initiated from the Node B management system to make the resources unavailable at the Node B. In response, the CRNC will send a Shutdown Complete Indication to the Node B after clearing traffic associated with the logical resource. The administrative state of the logical resource will then be set to Lock. The figure below indicates the message flow.



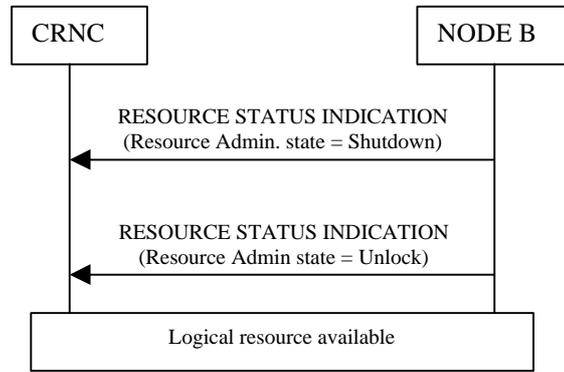
3.4 Lock overriding shutdown

A Resource Status Indication message for the lock of a logical resource will override a currently executing Resource Status Indication procedure for the shutdown of the resource. In this scenario, the lock procedure is initiated before the completion of the shutdown procedure.



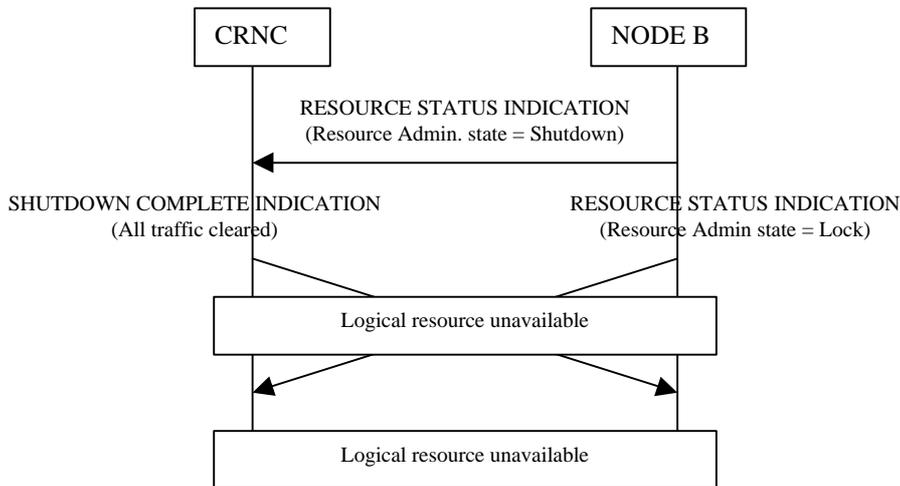
3.5 Unlock overriding shutdown

A Resource Status Indication message for the unlock of a logical resource will override a currently executing Resource Status Indication procedure for the shutdown of the resource. In this scenario, the unlock procedure is initiated before the completion of the shutdown procedure.



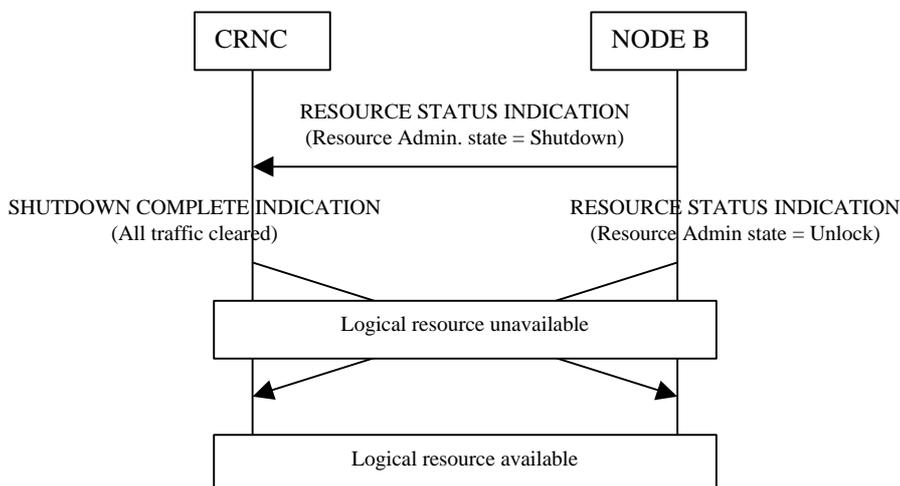
3.6 Lock prior to receipt of shutdown complete indication

Consider a Node B that sends a Resource Status Indication to the CRNC for the shutdown of a logical resource. The Node B then attempts to override the Shutdown by sending a Resource Status Indication to lock the resource. The lock request is sent before the Node B receives the Shutdown Complete Indication for the resource, yet after the CRNC has sent the Shutdown Complete Indication. Upon receipt of the lock request, the CRNC may ignore the request since the resource has already been locked by the previous shutdown procedure.



3.7 Unlock not overriding shutdown scenario

Consider a Node B that sends a Resource Status Indication to the CRNC for the shutdown of a logical resource. The Node B then attempts to override the Shutdown by sending a Resource Status Indication to unlock the resource. The unlock request is sent before the Node B receives the Shutdown Complete Indication for the resource, yet after the CRNC has sent the Shutdown Complete Indication. Upon receipt of the unlock request, the resource is already locked as a result of the Shutdown procedure. Therefore, the unlock request will result in the resource transitioning from the lock to the unlocked state.



4 Proposal

The following changes to TS 25.433 [1] are proposed –

1. Update sections 8.1.6.1 and 9.1.30 with the contents of Section 2.1
2. Update section 8.1.6.1 with the contents of Section 2.2.
3. Create a new section in 9.1 with the message contents from Section 2.2.
4. Include in section 8.1.6.1 the contents of Sections 3.1 through 3.7 to clarify the use of the Resource Status Indication procedure for the lock, unlock and shutdown scenarios.
5. Remove the Block Resource procedure, section 8.1.2.1

5 References

- [1] 3GPP TS 25.433 - NBAP Specification v1.1.1
- [2] CCITT Recommendation X.731 Information Technology – Open Systems Interconnection – Systems Management: State Management function (01/92)
- [3] 3GPP TDOC 944 -