

A new metric for multi-hop path selection

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A new metric for multi-hop path selection

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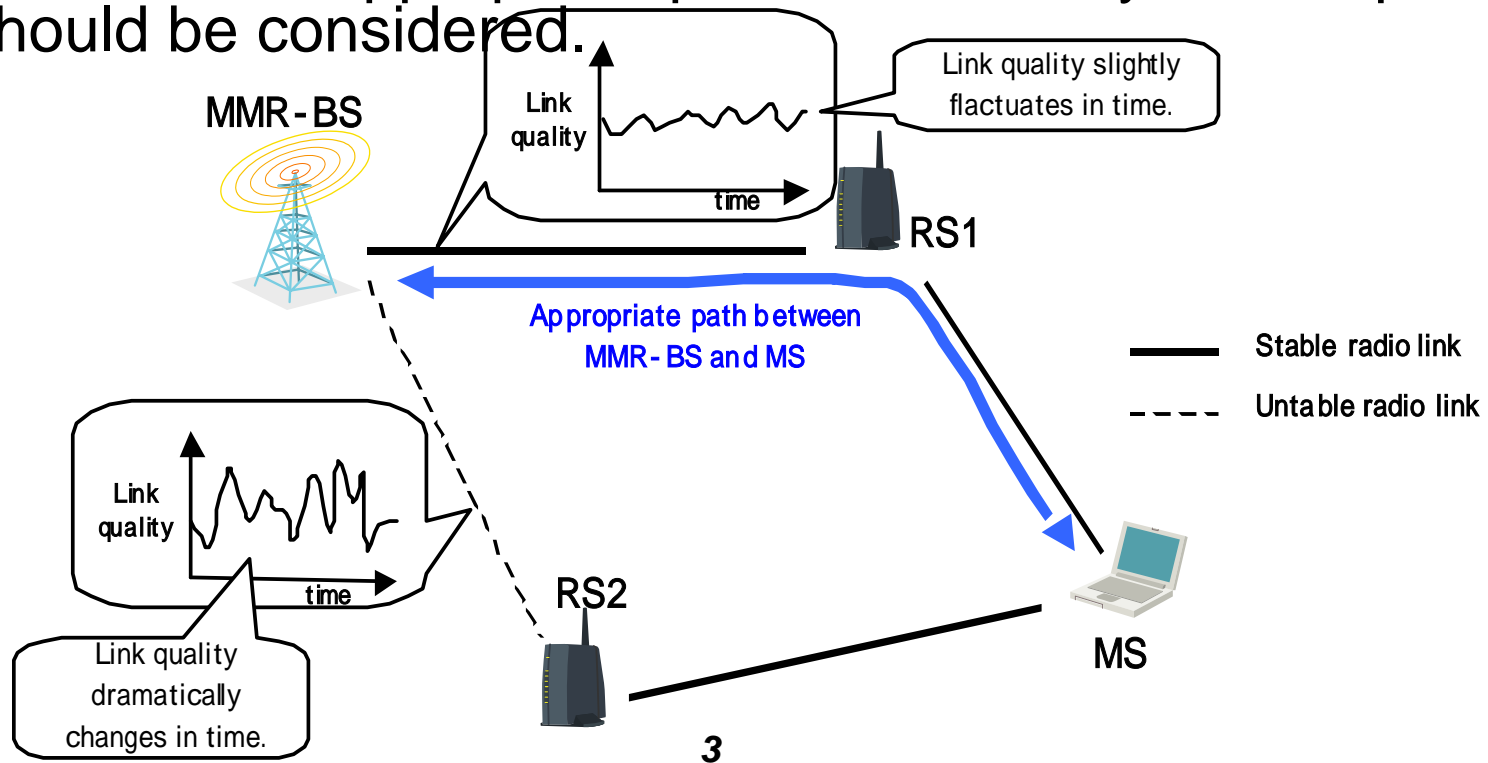
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Background

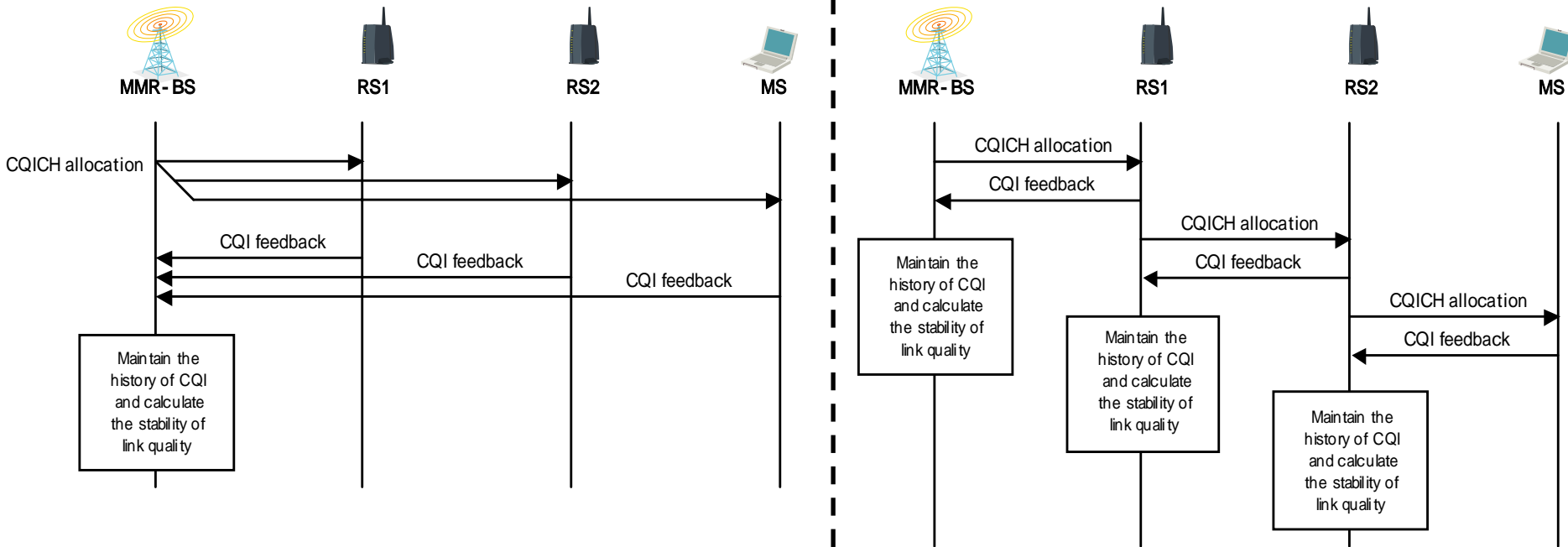
- In 802.16j system, a multi-hop path selection is one of the important functionalities for the efficient usage of radio resource in the network.
- In general, the fluctuation of radio link quality may occur because of movement of nodes, environmental factors (radio noise, obstacles, weather condition, etc.).
- To select an appropriate path, the stability of link quality should be considered.



Proposed Method

- We propose to add the stability of link quality as a metric of multi-hop path selection. There are advantages considering it:
 - Less frequent path changes: It can reduce the control overhead occurring by path changes.
 - Less data loss: It can avoid data loss by a sudden decrease of link quality.
- In order to get information regarding the stability of link quality, following methods are proposed:
 - Using a fast-feedback channel (CQICH)
 - Using REP-RSP messages (In case that CQICH cannot be used)
- No additional messages or sequences are needed to realize these methods.

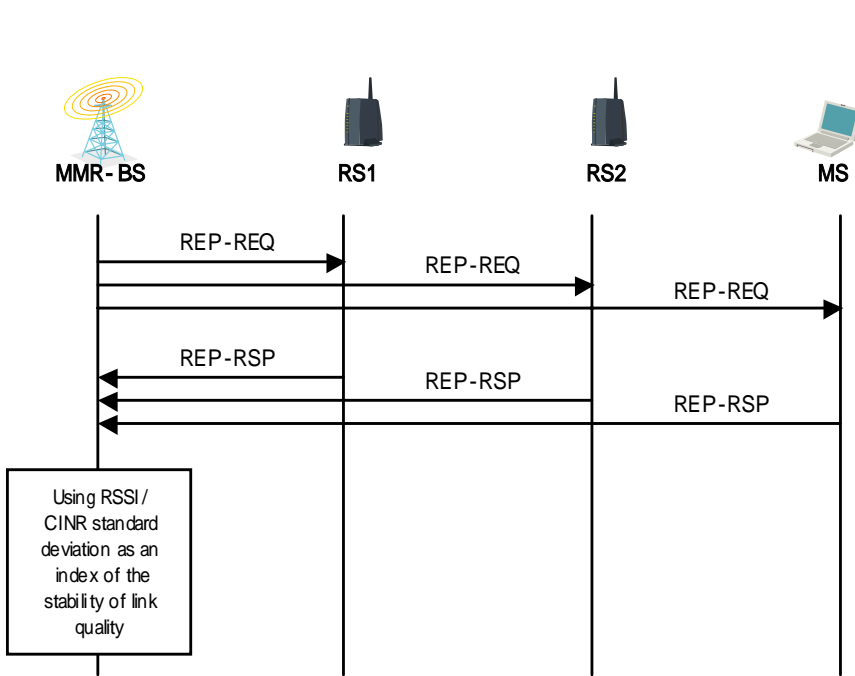
Method 1. Calculating the stability of link quality using a fast-feedback channel (CQICH)



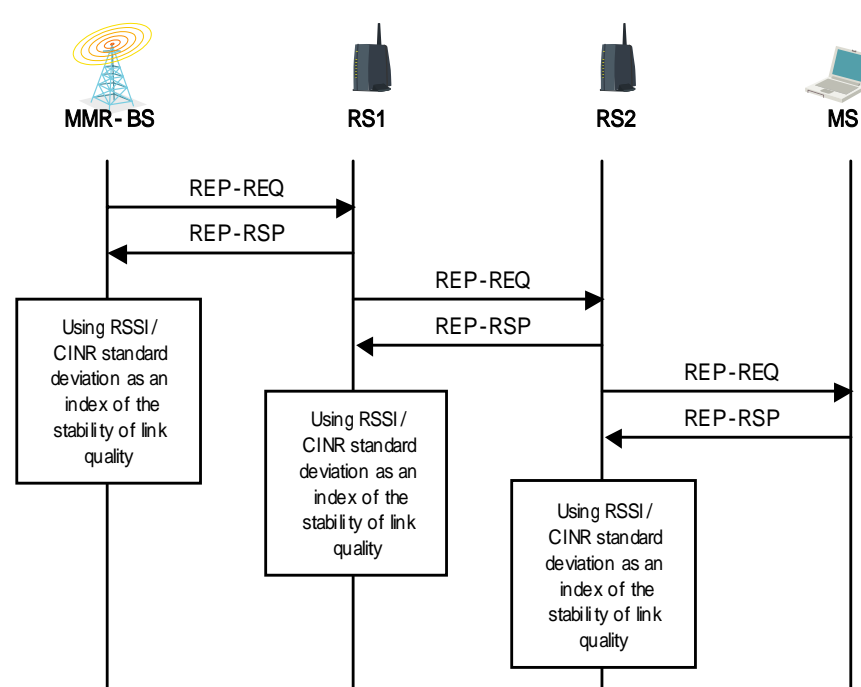
Using a fast-feedback channel (CQICH): Centralized scheduling

Using a fast-feedback channel (CQICH): Distributed scheduling

Method 2. Calculating the stability of link quality using REP-RSP messages



Using REP-RSP messages:
Centralized scheduling



Using REP-RSP messages:
Distributed scheduling

Proposed text changes

6.3.25 Relay path management and routing

[Insert the following text]

The stability of link quality shall be considered as a metric of multi-hop path selection. In order to get information regarding the stability of link quality, following methods may be used:

- Using a fast-feedback channel (CQICH)
- Using REP-RSP messages (In case that CQICH cannot be used)

In the centralized scheduling, MMR-BS may allocate CQICH to RSs and MSs. Allocation of CQICH for RSs is performed in the relay zone and the one for MSs in the access zone. RSs and MSs report CQI to MMR-BS, and MMR-BS may maintain the history of CQI. Based on this information, it calculates the stability of link quality which is used for the multi-hop path selection. The algorithm of calculating the stability of link quality is out of this standard.

In the distributed scheduling, MMR-BS and RSs may allocate CQICH to neighboring RSs and MSs. Allocation of CQICH for RSs is performed in the relay zone and the one for MSs in the access zone. MMR-BS and RSs collect CQI from neighboring nodes and maintain the history of CQI. Based on this information, they calculate the stability of link quality which is used for the multi-hop path selection. The algorithm of calculating the stability of link quality is out of this standard.

If the fast-feedback channel (CQICH) cannot be used, REP-RSP messages may be used, alternatively.

In the centralized scheduling, MMR-BS may send REP-REQ to RSs and MSs, requesting a RSSI standard deviation or a CINR standard deviation, and RSs and MSs may send REP-RSP to MMR-BS. MMR-BS may use the value of a RSSI standard deviation or a CINR standard deviation directly as an index of the stability of link quality.

In the distributed scheduling, MMR-BS and RSs may send REP-REQ to neighboring RSs and MSs, requesting a RSSI standard deviation or a CINR standard deviation. They receive REP-RSP from neighboring RSs and MSs. They may use the value of a RSSI standard deviation or a CINR standard deviation directly as an index of the stability of link quality.