Cross-Communications

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Cross-Communications (CC)

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At a glance

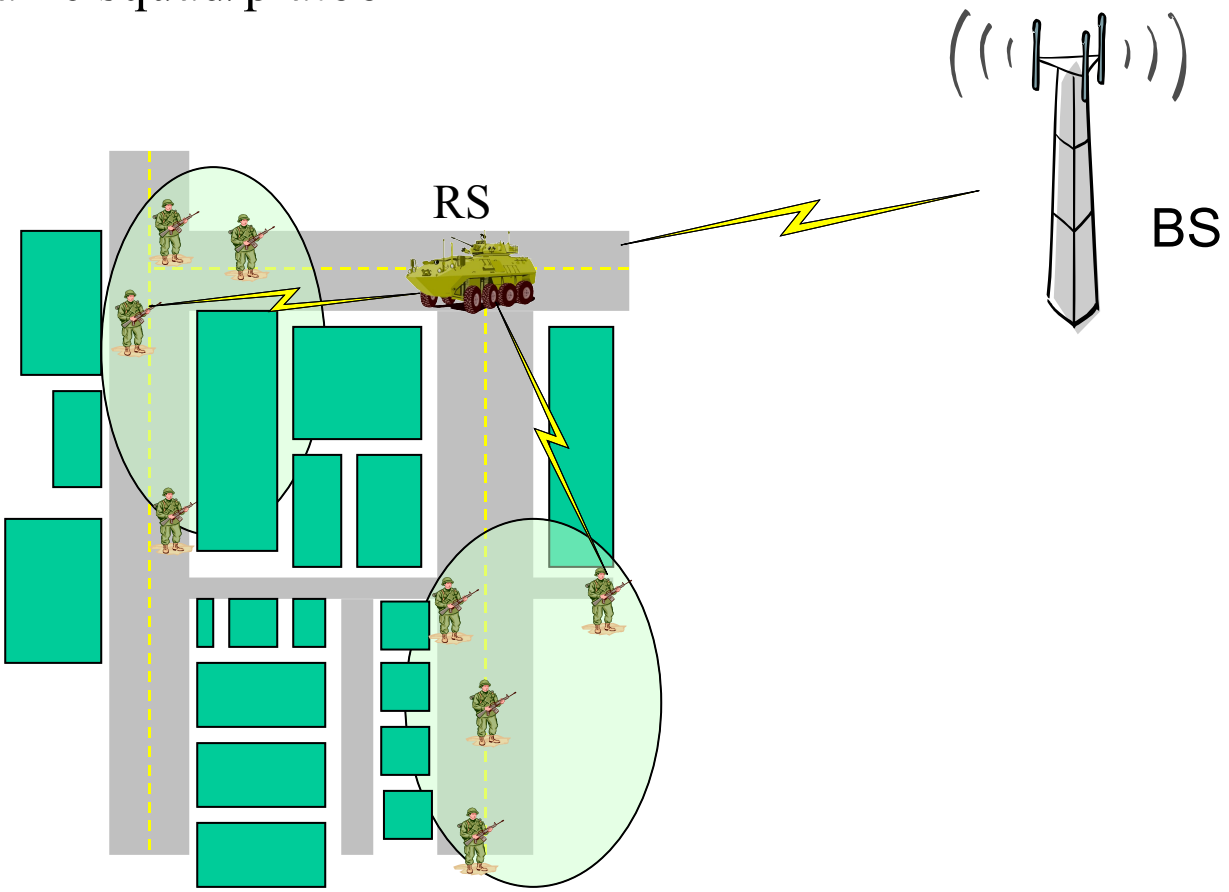
- Objectives
- Typical scenarios for Cross-Communications
- Advantages
- Short description
- Summary
- Comments on technical requirements

At a glance

- Cross-communication is to allow mobiles to communicate with each other via relay without going through the MMR-BS.
  - It is designed to minimize the overhead and delay for data transmissions
  - It is proposed as an optional communication mode
- Take advantage of the infrastructure provided by the interconnection of the RS
  - Extending RS Capabilities => Forwarding capabilities
- No modifications are required to BS operations
  - The BS still keeps control of the whole network
    - RSs are not Autonomous, they obey BS policies
    - Scheduling, Routing are managed by the BS and only enforced by the RS.

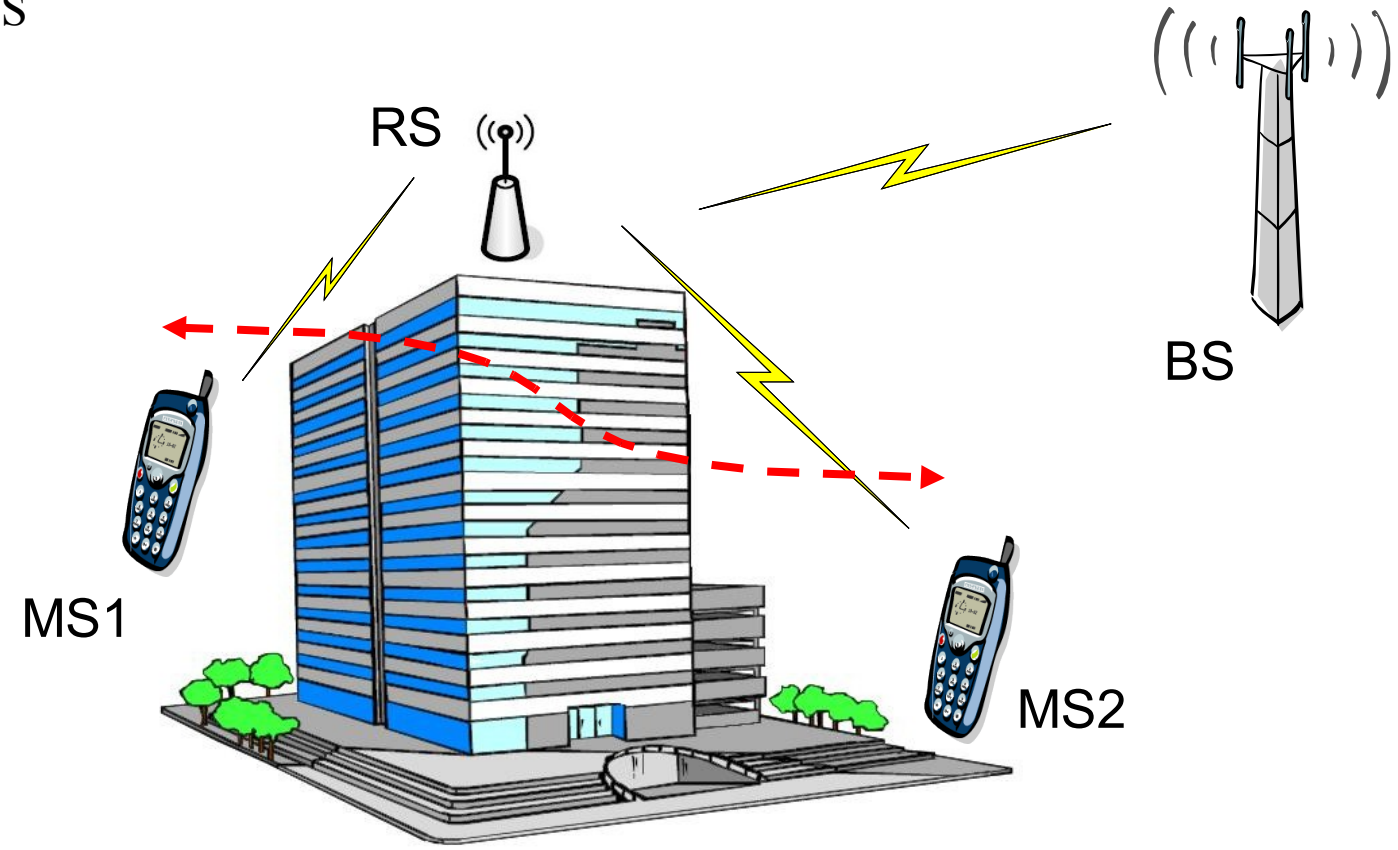
Scenarios

- **Example 1** : Military communication
  - Mobile user (e.g. soldier) communicates with another mobile user within the same squad/platoon



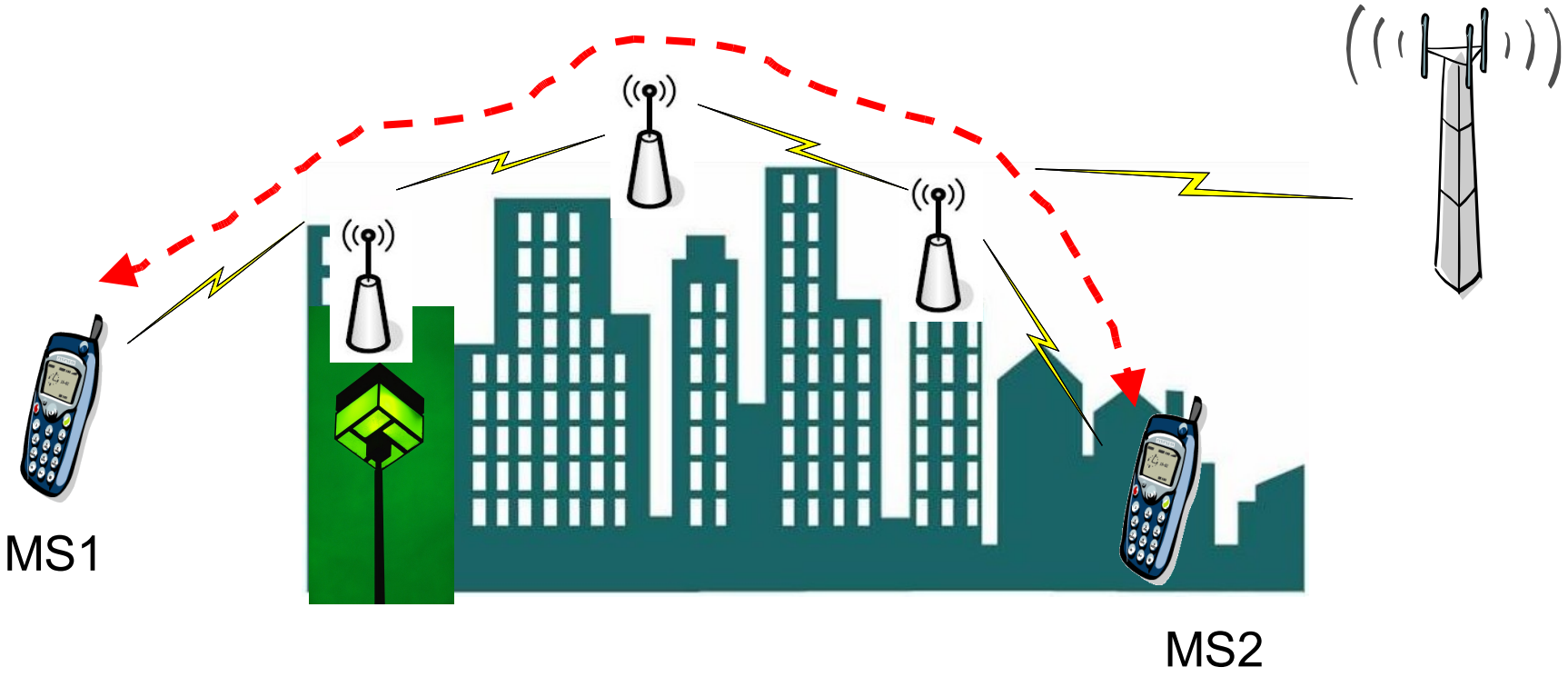
Scenarios

- **Example 2** : Communication in an office
  - Two MSs are located in the same building (same RS cell)
  - RF efficiency improved since data doesn't need to be transferred to the BS



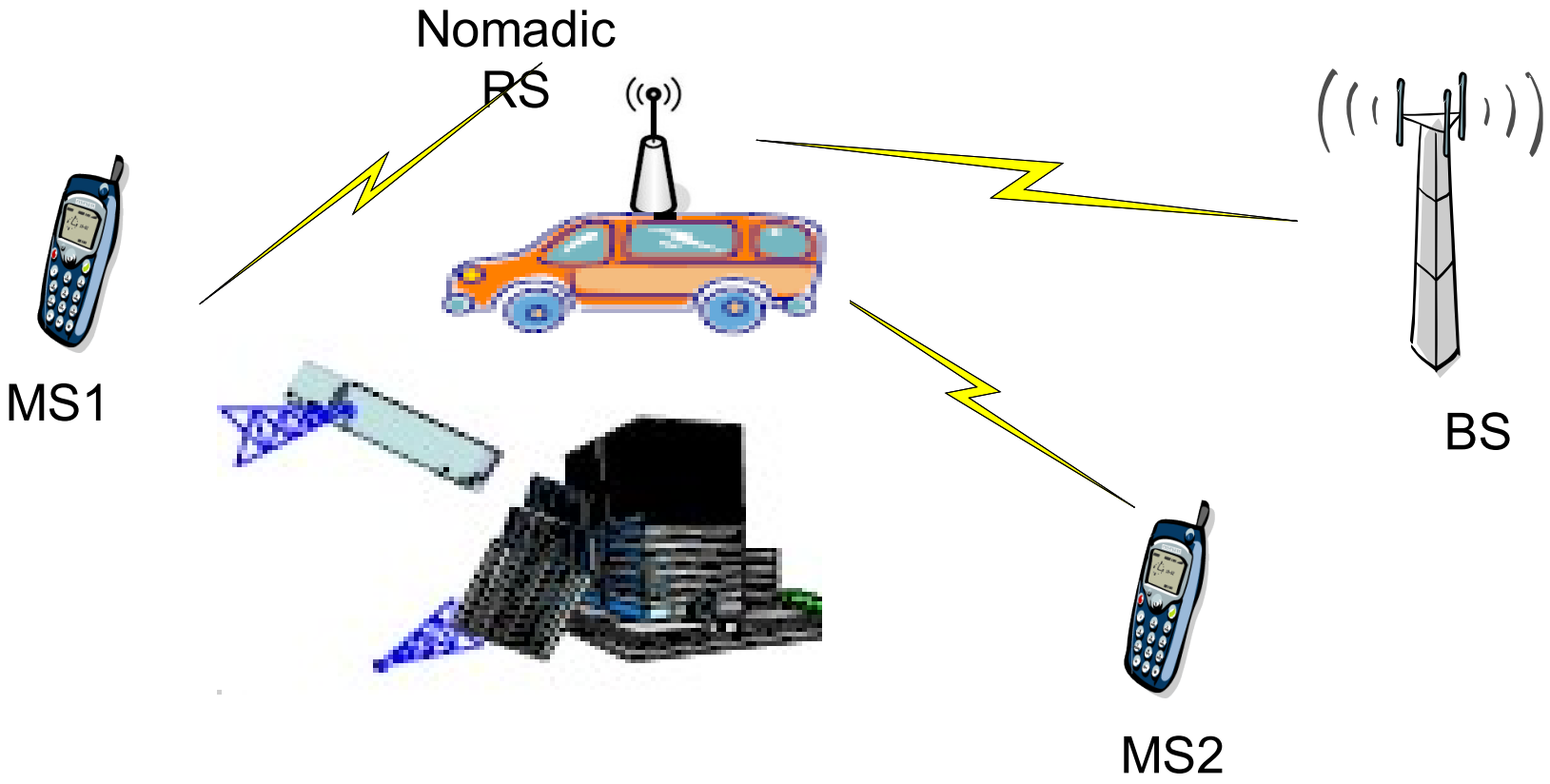
Scenarios

- **Example 3** : Communications among different RS cells
  - Two MSs are located in the same MMR cell but different RS cells



Scenarios

- **Example 4** : Emergency/Recovery situation

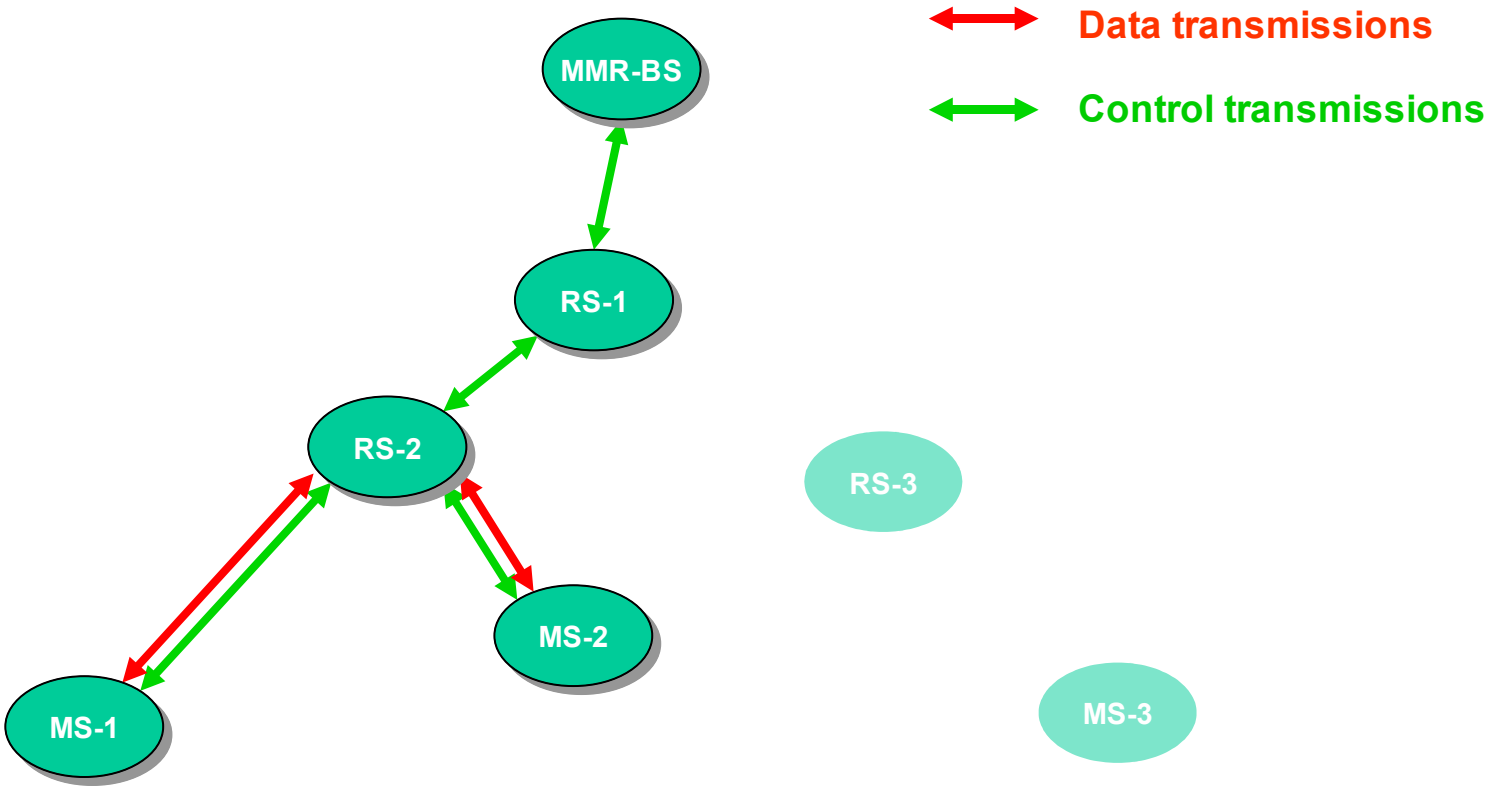


Advantages

- Bandwidth efficiency
  - Civilian applications
  - Military applications
- End-to-end delay minimization
  - Real-time applications (voice, video conference…)
  - Public safety applications
  - Military applications

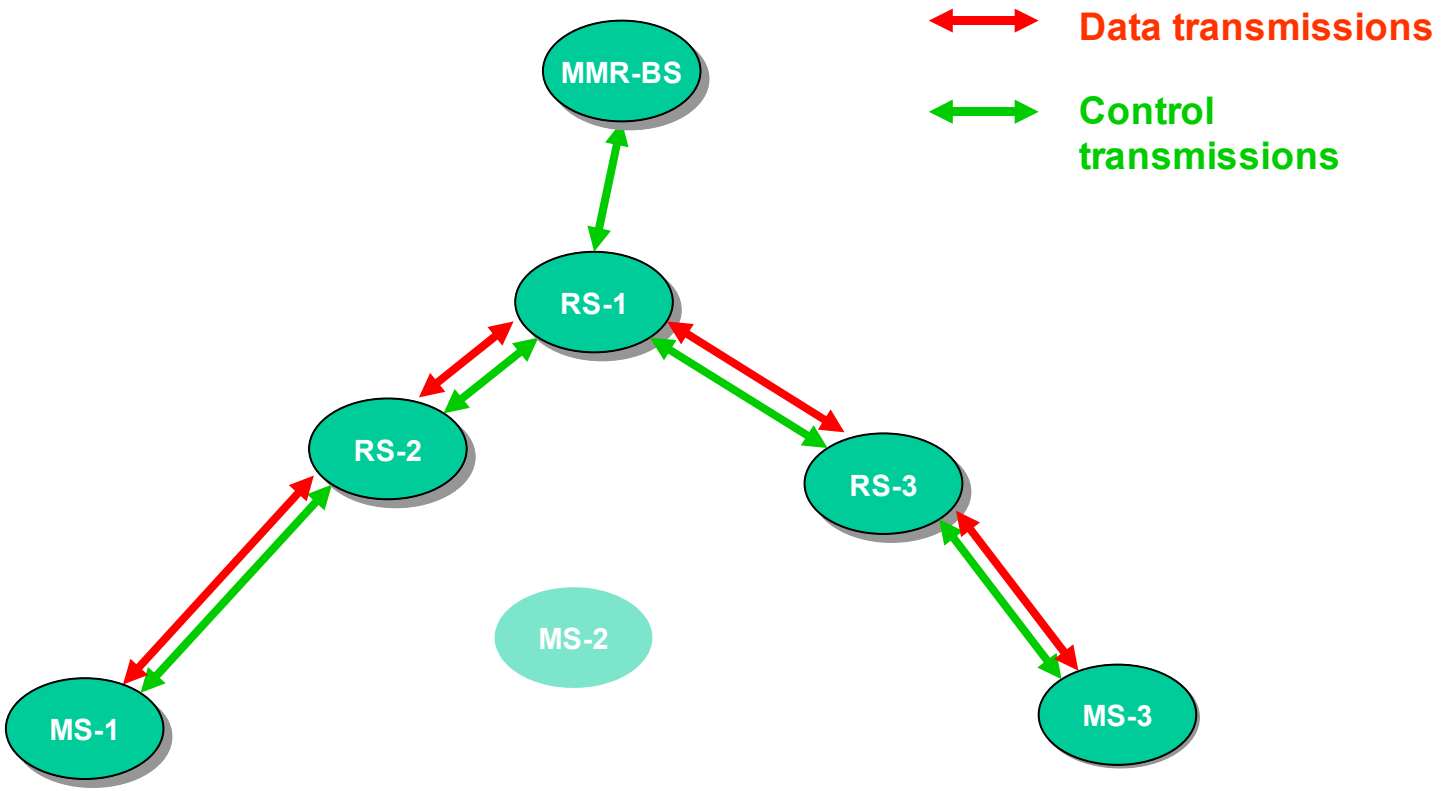
Short description

- Cross-Communication procedure is controlled by the BS
- Data transfer only passes through 1 RS



Short description

- Data transfer can go through multiple RSs in MMR cell



Short description

- CC doesn’t require any modification to the MS
  - It requires connections between MS and BS
  - 2 CID are used for 1 Cross-Communication
- The topology is still a **tree** (not a mesh)
- CC authorization is based on the following conditions
  - Involved RSs have CC capabilities (optional feature)
  - CCs is allowed by the infrastructure owner policy
  - BS authorizes CC for given CID’s…
  - CC can be disabled when call interceptions are requested

Summary

- Cross-Communications could be an optional mode
  - It doesn't have to be implemented
- CC bring many advantages
  - Bandwidth efficiency (significant for service providers):
    - CAPEX optimization
  - Delay minimization
  - BS processing load is reduced for data traffic
- It is compliant with the 802.16j objectives
  - A connection is set up between MS and BS
  - The topology is a tree
  - No changes required in MS
- CC procedure is controlled by the BS

Comments on technical requirements

- M15 : MAC PDU processing
  - **Set RS to Optional**
  - The optional use of CC requires MAC PDU processing in the RS

- O1 : Relay path selection
  - **Add the sentence "The path selection mechanism must also be capable of setting up and maintaining separate paths for control and data"**
  - Optionally paths for control and data can be different when using CC