

# Group Resource Allocation Mechanism for Real-time Services

Document Number:

IEEE C802.16m-08/786r2

Date Submitted:

2008-07-07

Source:

Kevin Power, Sunil Vadgama and Chris Williams

Fujitsu

[kevin.power@uk.fujitsu.com](mailto:kevin.power@uk.fujitsu.com)

[sunil.vadgama@uk.fujitsu.com](mailto:sunil.vadgama@uk.fujitsu.com)

[chris.williams@uk.fujitsu.com](mailto:chris.williams@uk.fujitsu.com)

RE: IEEE 802.16m-08-024 - Call for Contributions on IEEE 802.16m-08/003r3 System Description Document (SDD)

Purpose:

For discussion and approval

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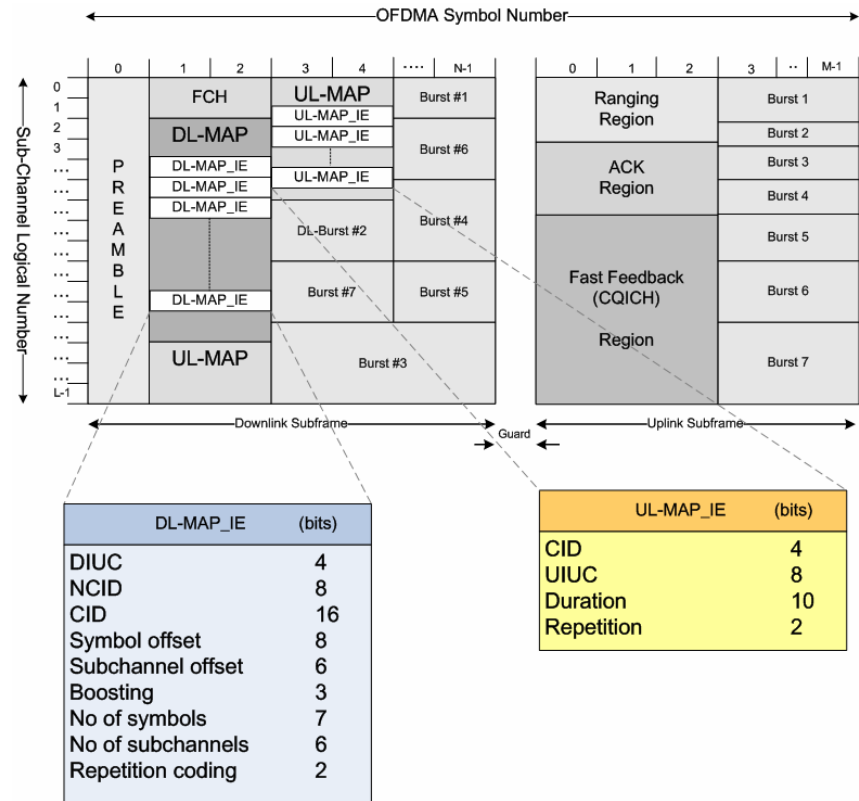
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# Introduction

- It is crucial for 802.16m to efficiently support real-time services such as VoIP and Gaming.
- The legacy control signalling is not optimized for these types of services and results in high overheads thus reducing system capacity
- The 16m SRD calls for a VoIP capacity that is 1.5x that of the reference system
- However, the current DL control section in the SDD does not include details on Resource allocation mechanisms for efficiently supporting real-time services
- Therefore, this contribution proposes a group resource allocation mechanism that can be used for efficiently supporting small payload, real-time services. SDD text is also provided.

# Legacy Signalling for VoIP

- User are allocated resource via broadcast DL-MAP and UL-MAP
- For all data packets including VoIP, each user will require DL-MAP\_IE and UL-MAP\_IE signalling which can provide flexible resource allocation
- DL-MAP\_IEs are based on 2-D resource allocation and include a 16 bit CID field
- Moreover, broadcast DL and UL-MAPs require up to 6 repetitions depending on the required cell coverage
- The Sub-MAP signalling mechanism may be used to reduce overhead but the limitation still exists as the resource allocation is based on the flexible but inefficient MAP\_IE structure

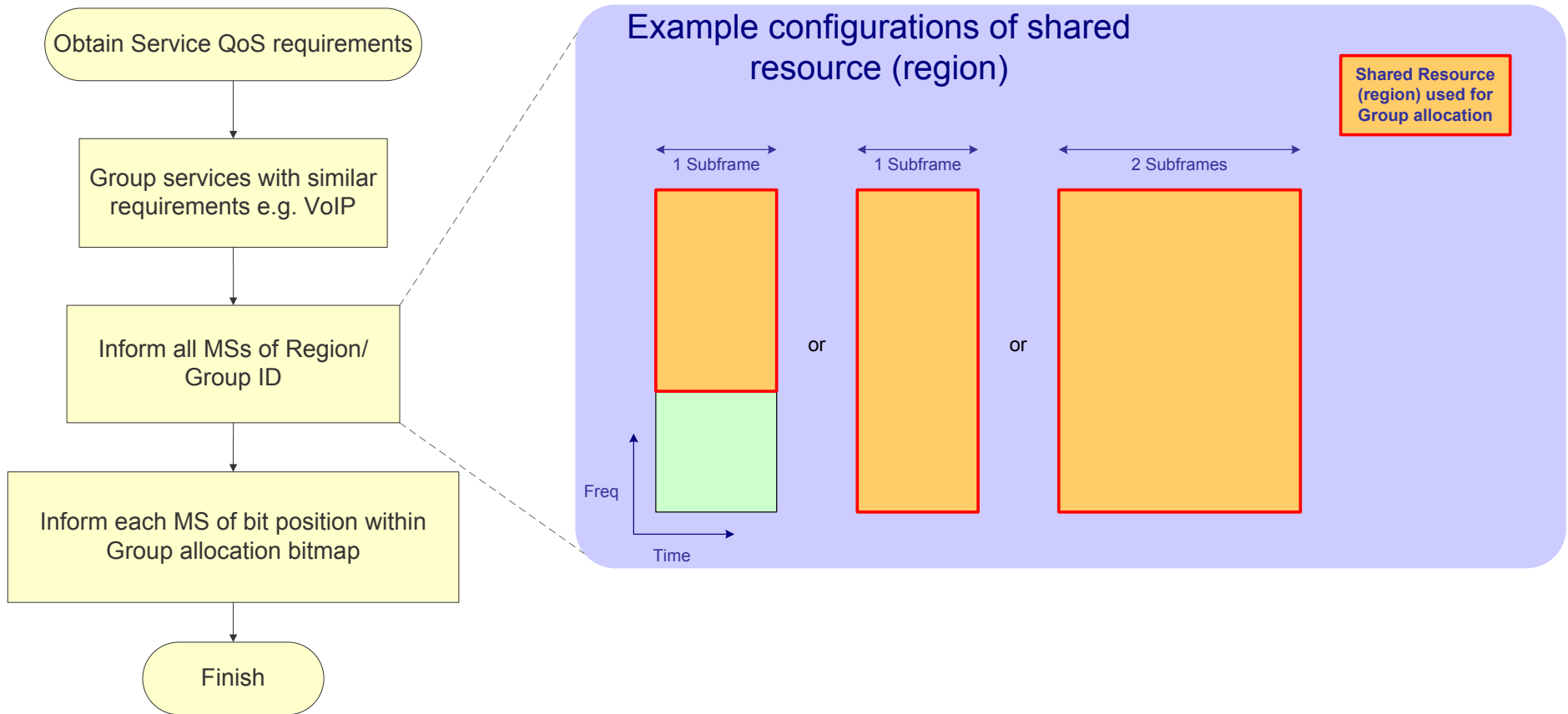


For a high number of users requiring small payload bursts then this signalling mechanism is inefficient and can have a serious impact on the achievable capacity of the system

# Group Based Resource Allocation

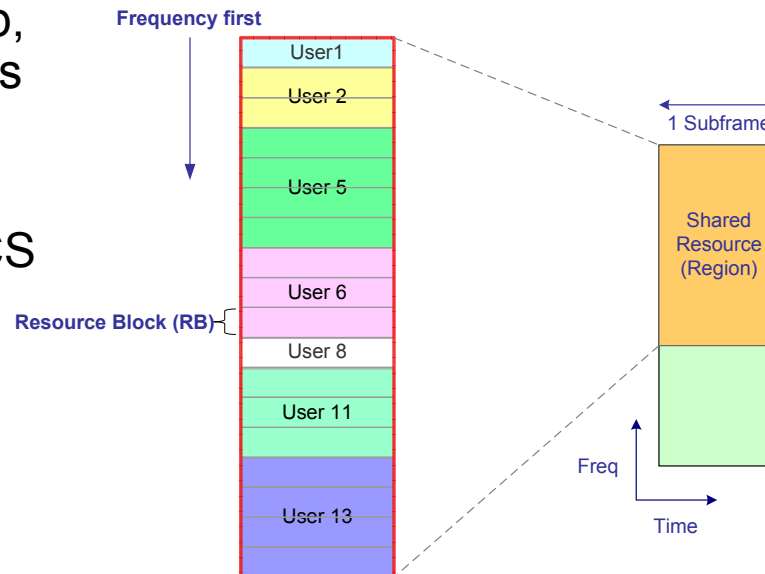
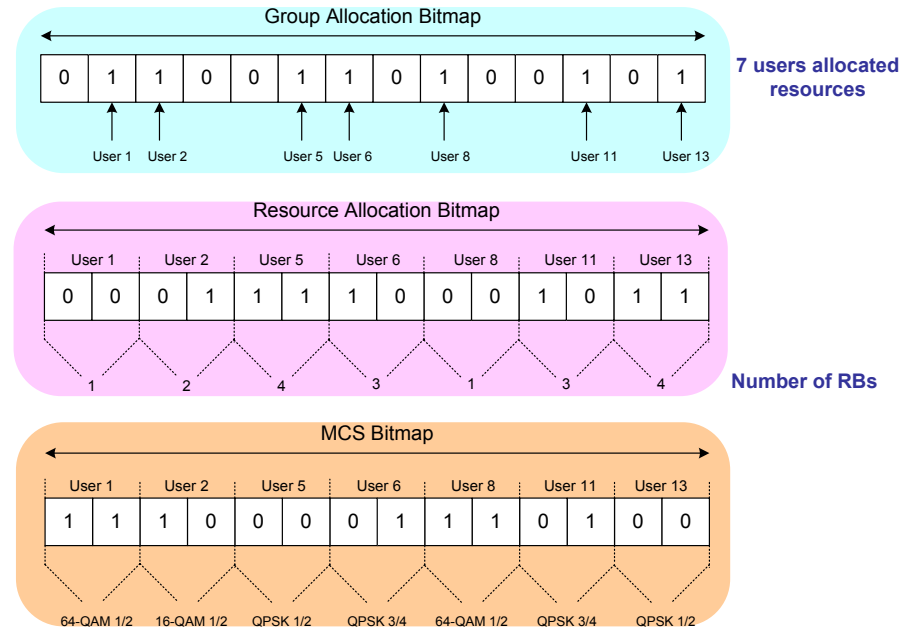
- Group based resource allocation comprises of two stages
  - **Stage 1 – Service Setup Procedure**
    - users with similar QoS requirements are grouped together
    - the group is then assigned to a shared resource (region) within the subframe/frame where it will be informed of and receive resource allocation for the purposes of data transport
  - **Stage 2 – Resource Allocation Procedure**
    - based on Stage 1 information the MS can determine the shared resource assignment
    - MS uses Group allocation bitmap that indicates if it has been allocated resource
    - The first allocated MS will be assigned the first resource, the second MS to the next available resource and so on.
    - MS can then use Resource Allocation bitmap to determine how many RBs it has been allocated (duration)
    - If users in group have different MCS, each MS may use an MCS bitmap to determine MCS of allocated resource. Note, we cannot assume that all users in a group have same MCS

# Stage 1 – Service Setup Procedure



# Stage 2 – Resource Allocation

- Using the Group/Region ID assigned to the Group of users, each MS can determine the location of the shared resource
- Using the Group allocation bitmap and the pre-assigned bit position, each MS can determine if it has been allocated resource
- Using the Resource allocation bitmap, the MS can determine how many RBs have been allocated
- Additionally, the MS may use the MCS bitmap to determine MCS of the allocated resource



# Proposed SDD text

*Insert the following text into DL Control Structure sub-clause in SDD (C802.16m-08/003r3):*

----- *Text Start* -----

## **11.6.2.3.1.2.1 Group based control information**

A group based control structure can be used for supporting real-time services such as VoIP and Gaming. A Region/Group ID will be used to uniquely assign the group of users to a shared resource (region) within a subframe(s).

### **11.6.2.3.1.2.1.1 Group allocation bitmap**

A group allocation bitmap will be used to indicate which users have been allocated in a particular shared resource/Region.

### **11.6.2.3.1.2.1.2 Resource Allocation information**

For users assigned an allocation within the shared resource, additional bitmaps can be used to indicate how many resource blocks (RBs) have been allocated and which MCS has been used.

----- *Text End* -----