

Service Flow Management and Scheduling Services in 802.16m

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Venue:

Re: MAC: Data Plane; in response to the TGM Call for Contributions and Comments 802.16m-08/033 for Session 57

Base Contribution:

This is the base contribution.

Purpose:

To be discussed and adopted by TGM for the 802.16m SDD

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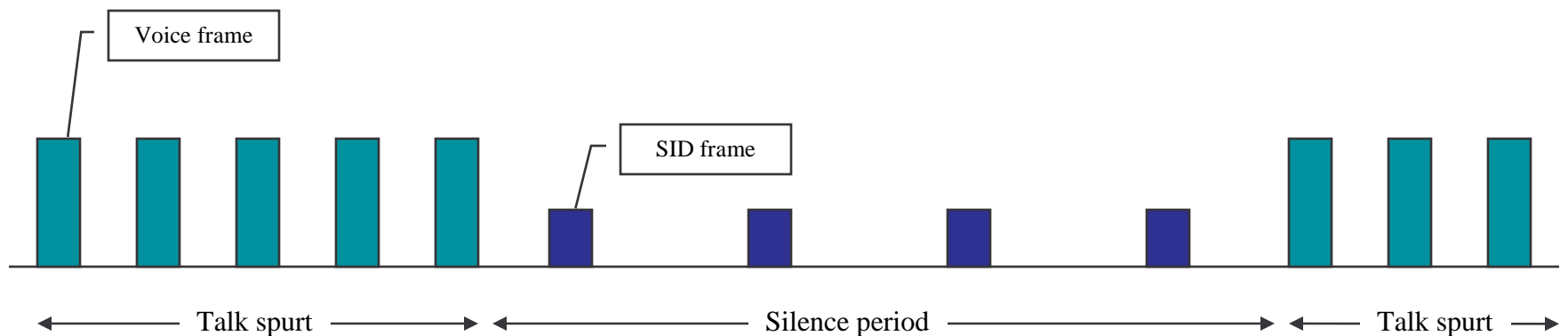
Outline

- Service flow management for application with multiple sets of SF parameters
- New scheduling service class for real-time non-periodical traffic

Switching between Service Flow Parameter Sets

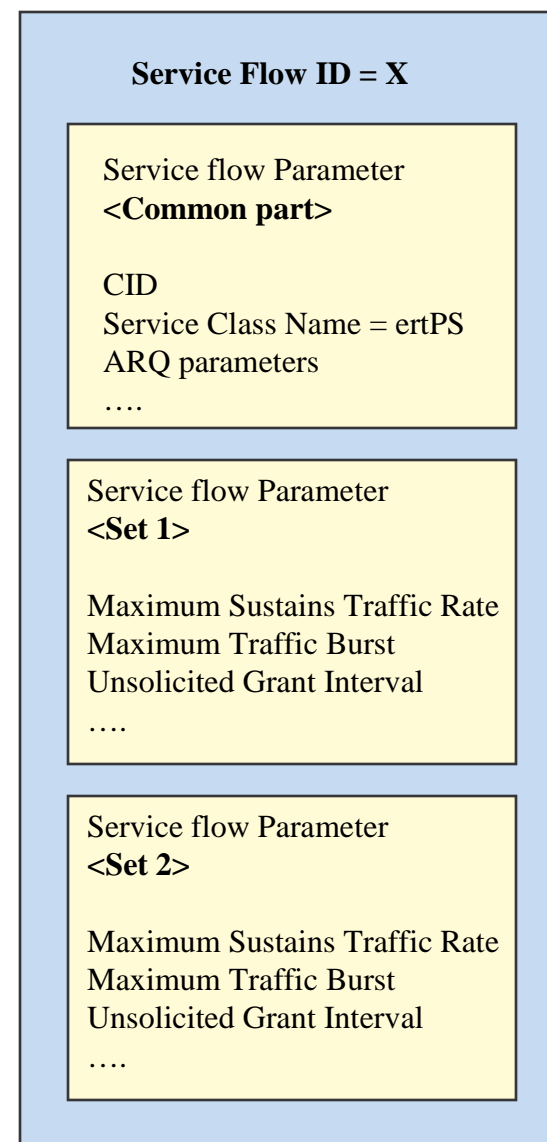
Motivation

- As defined in 16e, one service flow is associated with one set of service flow parameters.
- However, some application may have different QoS requirement and traffic characteristics during different stage.
 - For example, VoIP applications have talk spurt where voice frames are sent and silence period where SID frames are transmitted.

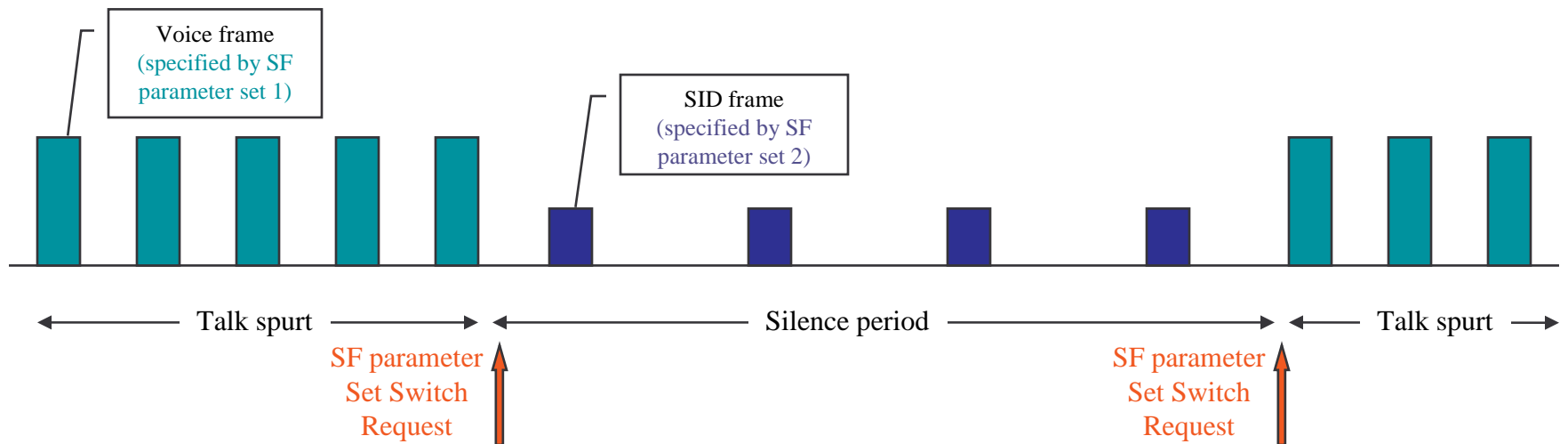


Proposed Scheme

- One service flow may be associated with one or more service flow parameter sets.
 - Each service flow parameter set corresponds to the QoS requirement/traffic characteristics of the service flow during one time period.
 - The MS and BS negotiate the supported service flow parameter sets during service flow setup procedure.
- When QoS requirement/traffic characteristics changes from one set to another, the MS requests the BS to switch the Service Flow parameter set.
- The BS then allocates resource according to the new service flow parameter set.
- Example of SF parameter set is shown on the right



Application Example



- Voice codec such as G. 723, G. 729, AMR use silence suppression mechanism to reduce bandwidth consumption during silence period.
 - SID frame may be transmitted periodically or non-periodically
 - For AMR, SID frame is transmitted periodically
 - For G.723.1, SID frame is transmitted whenever needed
- SF parameters for voice can be defined as set 1, while SF parameters for SID can be defined as set 2.
- When silence period starts for UL, MS signals to BS the indication of SF set switching from 1 to 2. BS then allocates bandwidth according to the traffic characteristics of the SID frame.
 - For codec with periodical SID, BS allocates X bytes periodically for MS to transmit SID frame.
 - For codec with non-periodical SID, MS signals request for sending SID frame using contention based or non-contention based resource, and BS allocates X bytes once upon receiving the request.
- When silence period ends for UL, MS signals to BS the indication of SF set switching from set 2 to 1. BS then allocates bandwidth according to the traffic characteristics of voice frame.

Proposed text changes for 802.16m SDD

- Section 10.x: QoS
- Section 10.x.2: Service Flow Management
 - One or more sets of service flow parameters are defined for one service flow.
 - Each service flow parameter set corresponds to the QoS requirement and traffic characteristics of the service flow during one time period.
 - The MS and BS negotiate the supported service flow parameter sets during service flow setup procedure.
 - When QoS requirement/traffic characteristics for UL traffic changes from one set to another, the MS requests the BS to switch the Service Flow parameter set. The BS then allocates resource according to the new service flow parameter set.

New Scheduling Service Class for Realtime Non-periodical Traffic

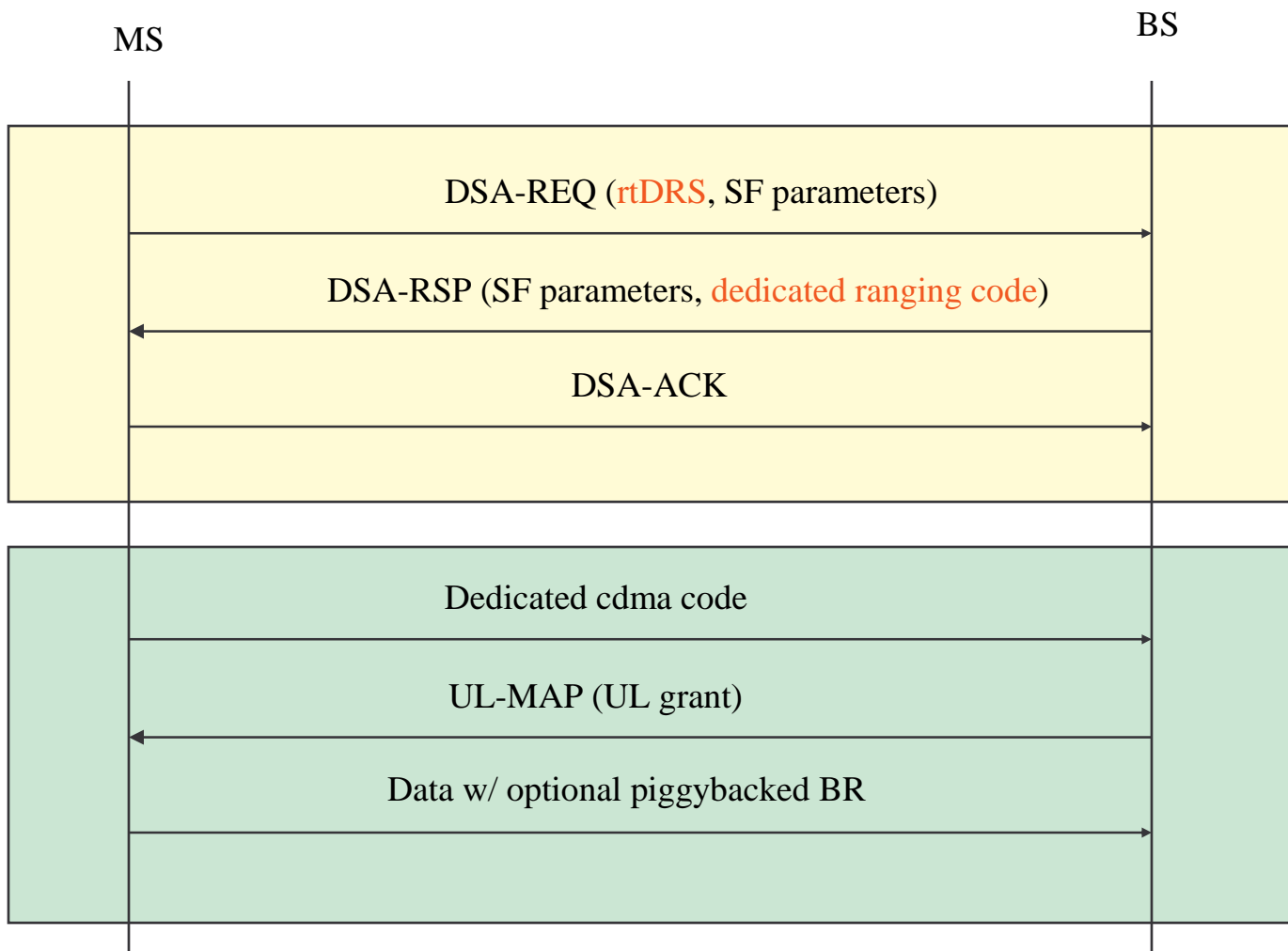
Motivation

- Periodical allocation (e.g., UGS, ertPS) and periodical polling (e.g, rtPS) provide periodic allocation or unicast request opportunity to MS to meet realtime requirement of the traffic. However it only applies to RT traffic with periodical pattern.
- There are still traffic (e.g., on-line gaming, instant messaging) with realtime requirement but doesn't have periodical traffic pattern.
- A **new scheduling service class** needs to be defined to support **realtime non-periodical traffic**.

RealTime Dedicated Ranging channel based Service

- Realtime Dedicated Ranging channel based Service (rtDRS)
 - A dedicated ranging code is allocated to the connection during service flow establishment procedure.
 - The service flow parameters for rtDRS include a default bit rate.
 - Once receiving the dedicated ranging code, the BS grants the resource based on the default bit rate defined in SF parameters.
 - No bandwidth request header needs to be sent.
 - If more bandwidth is needed, MS sends a piggybacked BR together with the data.

Flow Example



Proposed text changes for 802.16m SDD

- Section 10.x: QoS
- Section 10.x.1: Scheduling Service Classes
- Section 10.x.1.x: Realtime Dedicated Ranging channel based Service (rtDRS)
 - The rtDRS is designed to support real-time UL service flows that transport variable-size data packets on a non-periodical basis, such as on-line gaming.
 - The service offers dedicated ranging code for MS to indicate its request for UL grant for the service flow.
 - Upon receiving the dedicated ranging code, the BS grants the UL resource based on the default bit rate defined in the service flow parameters.
 - The MS may request for more bandwidth by sending piggybacked bandwidth request together with data.