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Title	**Signaling for provisioned service flow completion**
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Re:	This contribution is for call for contribution about IEEE P802.16e/D5-2004
Abstract	This contribution proposes the signaling method for provisioned service flow completion.
Purpose	
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Signaling for provisioned service flow completion

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1. Problem statements

After the transfer of operational parameters (for managed SS) or after registration (for unmanaged SS), the BS shall send DSA-REQ messages to the SS to set up connections for pre-provisioned service flows belonging to the SS.

Here, the problem is that the MSS does not know whether the serving BS has completed pre-provisioning of all service flows belong to the MSS or not. Therefore, before the specific service flow has not been provisioned by BS, a MSS may initiate MSS-initiated DSA transaction for the service flow. In this case, the MSS needs to perform contention-based ranging process in order to obtain uplink bandwidth for DSA-REQ message and BS needs to response with DSX-RVD. Even if the BS successfully receives the MSS-initiated DSA-REQ message, it can not be sure the QoS profile specified by the MSS is approved. The MSS-initiated DSA transaction without the information of the pre-provisioned service flows may cause more signaling delay and a waste of resource.

Service flow has some characteristics:

- DSA transaction may be initiated by either the MSS or the BS
- A DSA transaction may create either one uplink or one downlink service flow.
- More than one provisioned service flow may exist for the MSS.

If the BS contains more than one provisioned service flow for the MSS, the BS shall initiate several DSA transactions for provisioning of the service flows. As mentioned above, the MSS does not know how many DSA transactions for provisioned service flows the BS will perform. We may expect the following three occurrences.

It is assumed the first one out of all provisioned service flows has been established.

Case	MSS action	Problems
A	The MSS shall wait for the DSA messages.	Because the MSS does not know if the whole provisioning has been completed or not, the MSS may remain to be still waiting for some provisioned service flows.
B	The MSS misunderstands all service flows to be completely provisioned and then enters normal mode.	Although the BS has not finish the provisioning of service flows belonging to the MSS, the MSS may initiate a DSA transaction to establish a connection for the specific service flow. In this case, the DSA transaction by MSS may be ignored.
C	The MSS enters normal mode and does not initiate any DSA transaction more. The MSS may transmit any uplink data that can be characterized by diverse QoS profile through the previously established connection.	The QoS for the specific data transmission may not be satisfied enough.

2. Proposed remedies

We are going to propose two methods by which the BS is able to inform the MSS of the completion of service flows provisioning.

2.1.Remedy #1

Insert new parameter 'Provisioned Service Flow State' into Service Flow Encodings as shown in Table 1

Table 1 – Newly defined parameter inserted into Service Flow Encodings.

No	Parameters	Length	Notes
1	Provisioned Service Flow State	8 bits	0 : The last provisioned service flow 1 : Another provisioned service flows are still left.

2.2.Remedy #2

Modify "QoS parameter Set Type" field as shown in Table 2.

Table 2 – Modified field value

Type	Length	Value	Scope
[145.146].5	1	Bit 0 : Provisioned Set Bit 1 : Admitted Set Bit 2 : Active Set *Bit 3~7 : Reserved* Bit 3 = Continued Provisioned Set *Bit 4~7 = Reserved*	DSx-REQ DSx-RSP DSx-ACK

Bit 3: 0 The last provisioning
1 Another provisioned service flows are still left.

2.3.Remedy #3

Insert new parameter 'Provisioned Service Flow State' into DSA-REQ message as shown in Table 3

Table 3 – Newly defined parameters added to DSA-REQ message.

No	Parameters	Length	Notes
1	Provisioned Service Flow State	8 bits	0 : The last provisioned service flow 1 : Another provisioned service flows are still left.

2.1. Remedy #1

Insert new parameter 'Provisioned Service Flow State' into DSA-REQ message as shown in Table 3

Table 3 – Newly defined parameters added to DSA-REQ message.

No	Parameters	Length	Notes
XX	Number of Provisioned Service Flow State	8 bits	Total number of DSA-REQ including provisioned service flow for a MSS

3. Proposed text change

3.1.Remedy #1

[Modify Service Flow Encodings in table 381 as follows]

Table 381—Service Flow encodings

Type	Parameter
1	Service Flow ID
2	CID
3	Service Class Name
4	Reserved
5	QoS Parameter Set
6	Traffic Priority
…	…
28	CS Specification
143	Vendor-specific QoS Parameter
99-107	Convergence Sublayer Type
108	Provisioned Service Flow State

[Newly Insert following text in section 11.13.20]

11.13.20. Provisioned Service Flow State

Type	Length	Value
[145/146].108	1	0—Last provisioning 1—Continued provisioning

Parameters shall be as follows:
If Provisioned Set is marked, MSS shall see the 'Provisioned Service Flow State' parameter.

Bit 1= 1 : Provisioning procedure will be continue.
MSS shall wait for receiving next DSA-REQ message when current DSA transaction completes.
Bit 1= 0 : The last service flow provisioning.
MSS shall enter operational state when current transaction completes.

3.2.Remedy #2

[Modify QoS Parameter Set type in section 11.13.4 as follows]

This parameter shall appear within every service flow encoding. It specifies the proper application of the QoS Parameter Set: to the Provisioned set, the Admitted set, and/or the Active set. When two QoS Parameter Sets are the same, a multibit value of this parameter may be used to apply the QoS parameters to more than one set. A single message may contain multiple QoS parameter sets in separate type 145/146 ser-vice flow encodings for the same service flow. This allows specification of the QoS Parameter Sets when their parameters are different. Bit 0 is the LSB of the Value field.
For every service flow that is preprovisioned and for every provisioned service flow added after SS initialization, there shall be a service flow encoding that specifies a ProvisionedQoSParamSet. This service flow encoding, or other service flow encoding(s), may also specify an Admitted and/or Active set. If the received service flow is characterized by ProvisionedQoSParamSet, the MSS shall check bit #3 of QoS Parameter Set Type. If bit #3 is set to1, the MSS shall wait for next DSA transaction continuously. If bit #3 is equal to 0, the MSS shall consider the currently received DSA transaction as the last service flow provisioning.

Type	Length	Value	Scope
[145.146].5	1	Bit 0 : Provisioned Set Bit 1 : Admitted Set Bit 2 : Active Set Bit 3-7 : Reserved Bit 3 = Continued Provisioned Set *Bit 4-7 = Reserved*	DSx-REQ DSx-RSP DSx-ACK

A BS shall handle a single update to each of the Active and Admitted QoS parameter sets. The ability to process multiple service flow encodings that specify the same QoS parameter set is not required and is left as a vendor-specific function. If a DSA/DSC contains multiple updates to a single QoS parameter set and the vendor does not support such updates, then the BS shall reply with CC 2 (reject-unrecognized-configuration-setting).

3.3.Remedy #3

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[Modify Table 38 in section 6.3.2.3.10 as follows]

Table 38—DSA-REQ message format

Syntax	Size	Note
DSA-REQ_Message_Format() {		
Management Message Type = 11	8 bits	
Transaction ID	16 bits	
Provisioned Service Flow State	8 bits	
TLV Encoded Information	variable	TLV specific
}		

3.1. Proposed Remedy

[Insert following text after page23, line 26]

When a BS has multiple number Provisioned Service Flows to transmit an MSS, the BS may include Total number of Provisioned Service Flow TLV(11.7.20)

[Newly Insert following text at page 291 after section 11.7.19]

11.7.20. Total number of Provisioned Service Flow

When a BS shall transmit multiple DSA transactions for provisioned service flows, BS may include this TLV in REG-RSP message for provisioned service flows in order to indicate how many DSA transactions with provisioned service flows will be transmitted.

Type	Length	Value
21	1	Total number of DSA transactions for provisioned service flows for an MSS