

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Some consideration on the credit token principle	
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Re:	80216h-06_016: Second Working Group Review: P802.16h Working Document (2006-06-05)	
Abstract	Reconsideration on the principle of credit token.	
Purpose	Consolidate the WirelessMAN-CX mechanisms.	
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Some consideration on the credit token principle

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Overview

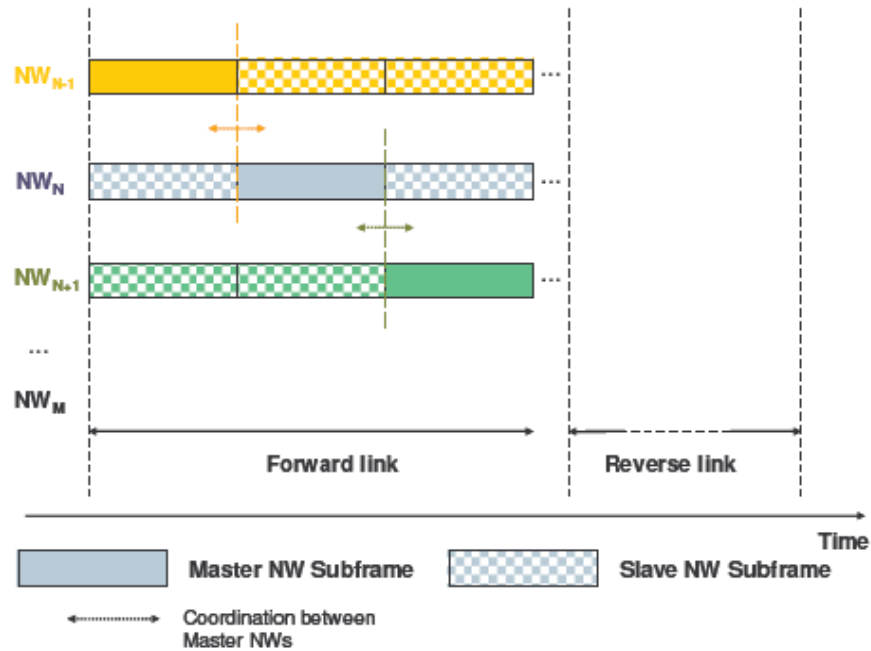
The basic principle of distributed variable subframe boundary may need reconsideration. I have address the issue last year, and have discussed with you for several time, but have not found a way out till now. Distributed variable subframe boundary may lead to the requirement that 2 neighbor systems of the same system can not allocated to the same subframe in the same channel, otherwise renting from one neighbor system for part of the subframe will also need renting from another at the same time. This will either lead to more partition of subframe or other solution which may significantly lower down the efficiency of the whole radio system. The interesting thing is the scope of credit token mechanism is trying to make the radio system more efficient.

This paper show some example to explain the issue of the subframe boundary distributed variation. We need better explanation to solve the misgiving.

Reference:

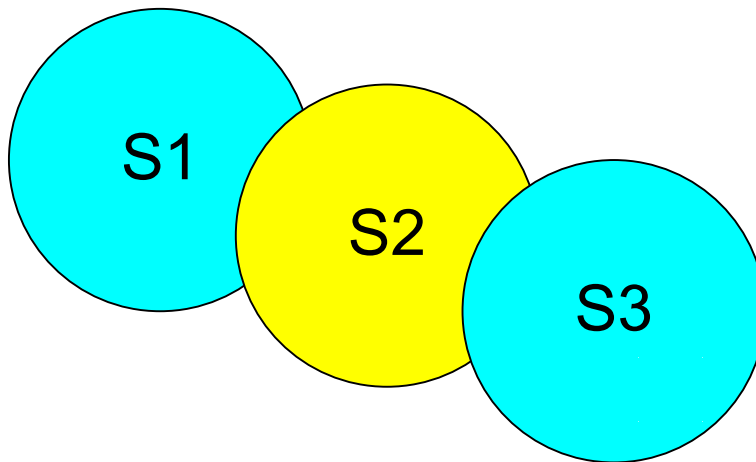
- [1] *IEEE 802.16h-06/014: 802.16h License-Exempt Task Group Meeting Minutes (2006-05-31)*
- [2] *IEEE 802.16h-06/015: Working Document for P802.16h (2006-05-31)*
- [3] *IEEE 802.16h-06/016: Second Working Group Review: P802.16h Working Document (2006-06-05)*

Discussion

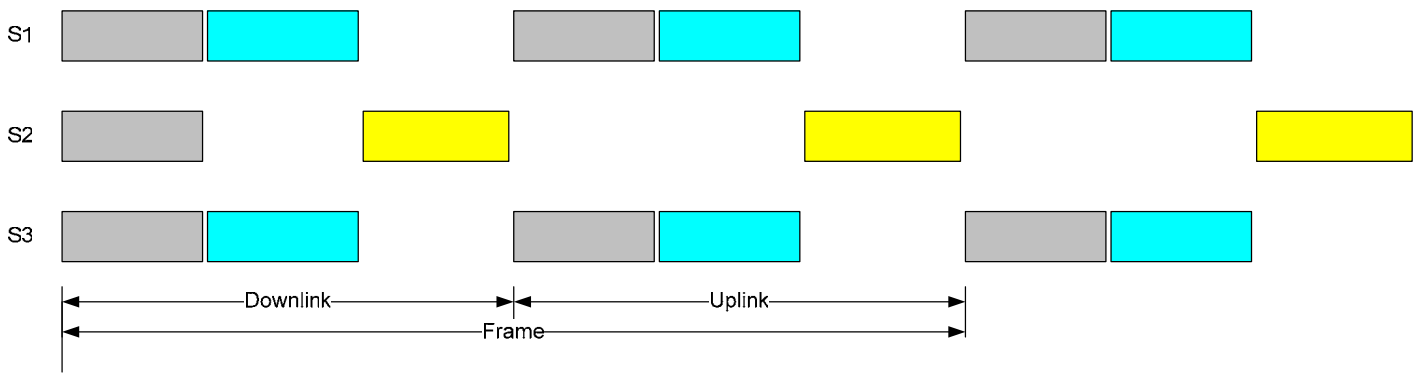


The figure above is taken from the current working document, talking about basic principle of credit token mechanism. This idea relies on the feasibility of distributed variable subframe boundary in WirelessMAN-CX system. I have shown my worry about it for a rather long time and no fundamental progress on this topic have been found yet.

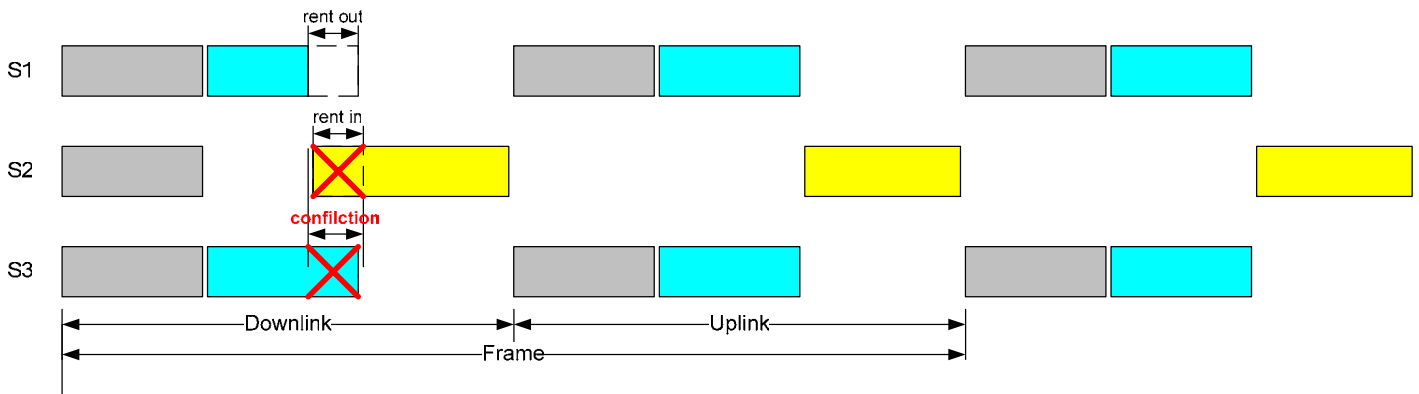
To clarify the issue, here is a simple example. Assume there is 3 systems deployed in the relationship below, S1 & S2 are neighbor system and S2&S3 are also neighbor. It's a very simple case that all the coexistence systems need to have the capability to deal with.



And here is a figure shown the original type1 frame structure using master-slave subframe approach inside current working document.

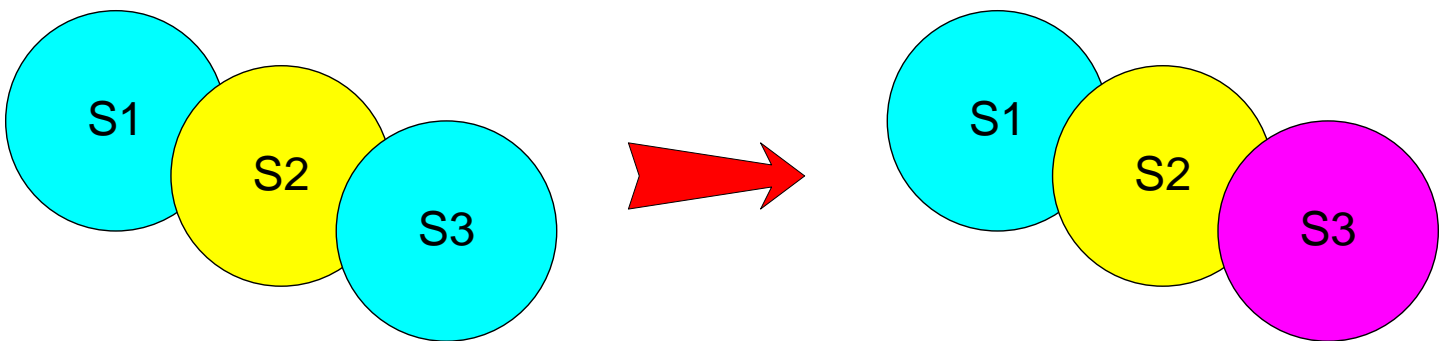


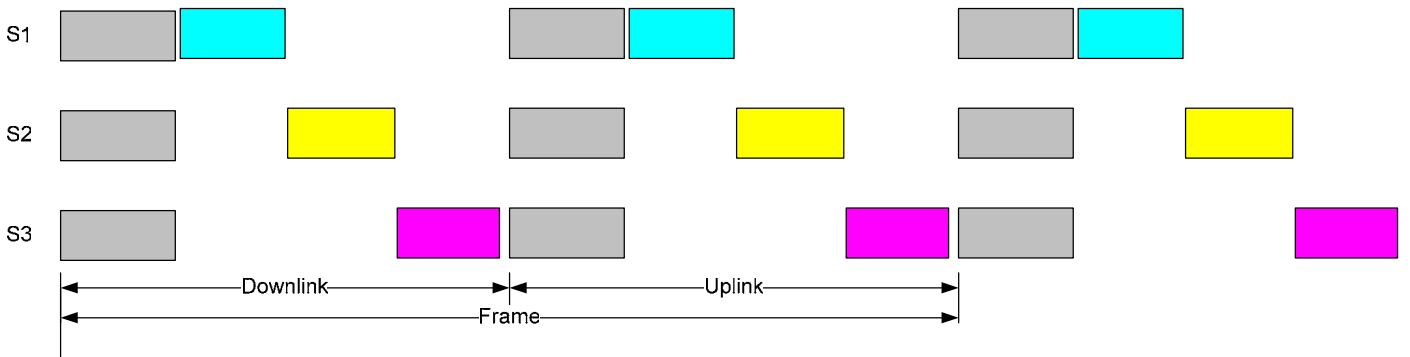
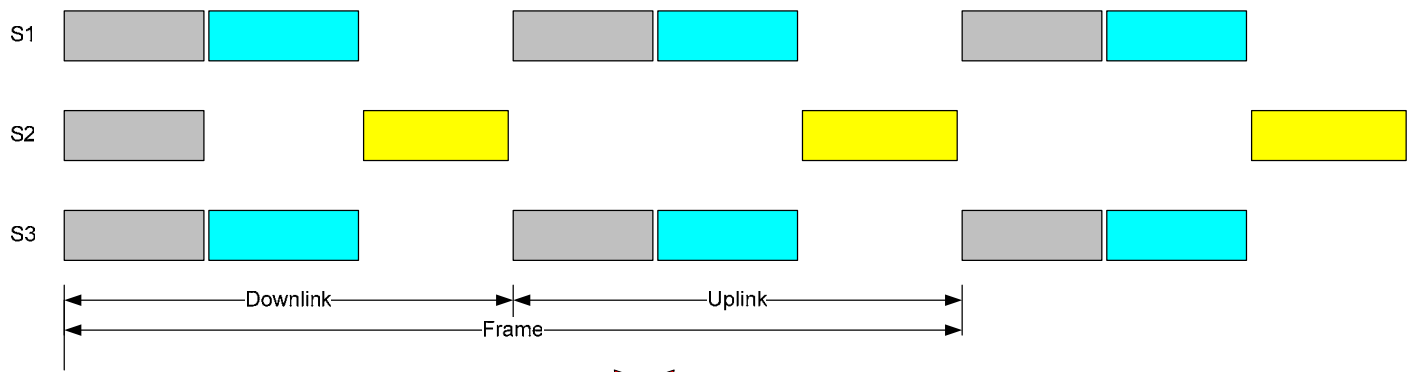
If the S1 find his downlink subframe are superfluous and about to rent it out to S2, and S2 are also want to rent in some bandwidth, they will negotiate using credit token mechanism described in current working document. And S1 may temporary successful rent out some bandwidth to S2, and the new result of frame structure become the aspect shown below:



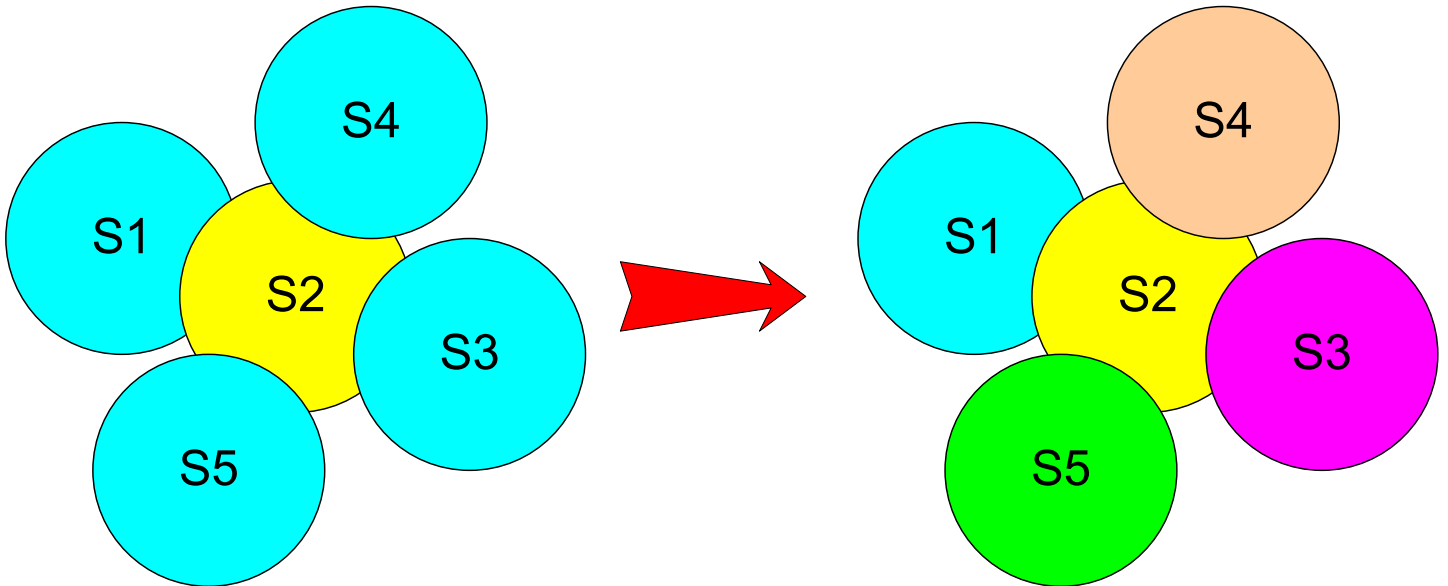
The issue here is easily seen, the time which S2 has rent in as its extension of master subframe will cause confliction with the master subframe of S3, and obviously affect S3's benefit, neither S2 itself can make use of the time just rent in from S1.

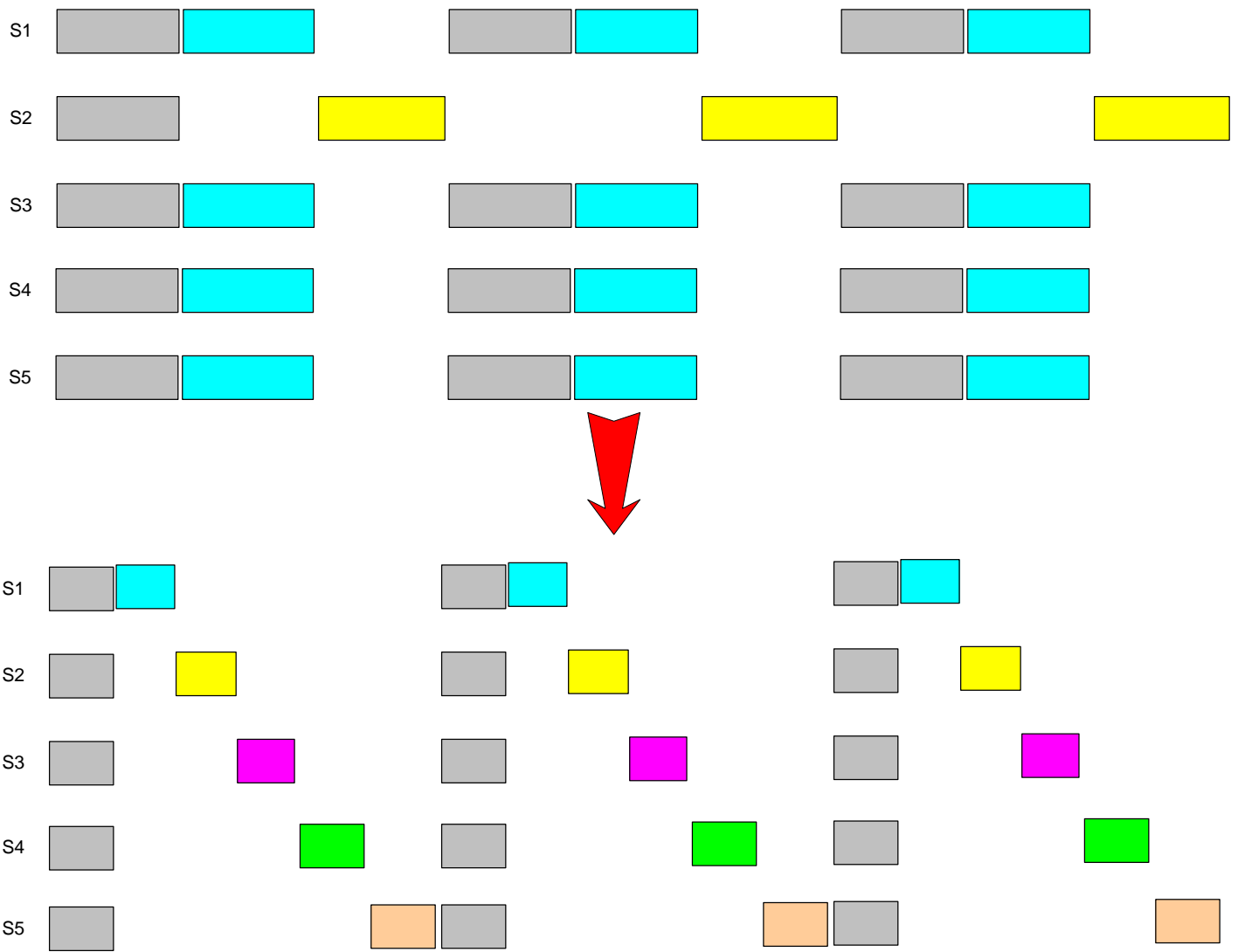
So we can conclude, using current credit token mechanism lead to the requirement that NO multiple neighbor systems of the same system can allocated to the same subframe in the same channel, which significantly lower down the efficiency of the whole radio system's capability. While to raise the radio total efficiency was the scratch line of the credit token mechanism.





Severer case will lead to worse situation, e.g.:





Conclusion:

We need to reconsider the feasibility of credit token mechanism and try to make progress.

Otherwise, if there is no further progress on solving this issue, I can find no reason to continue consolidating on implementation of credit token mechanism.