

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Action Items from Session #47: Discussion material on inter system communications and system architecture	
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Re:	Working Group Letter Ballot #24a for IEEE P80216h/D2	
Abstract	This contribution tries to bring together the inter-system communications issues and system architecture issues. The contribution provides some preliminary material for discussing the relevance of both backhaul and over the air inter systems communications in the light of the current (or revised) system architecture.	
Purpose	Discuss backhaul based, over the air based inter system communications vs. system architecture	
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Action Item from Session # 47: Discussion material on inter- system communications and system architecture

David Grandblaise
Motorola

Overview

Inter-system communications issues and system architecture issues are highly dependent in P802.16h/D2 [1]. The level of dependency is also related to the approach followed (backhaul or over the air based) for the inter-system communications. The inter-system communications rely on some system architecture elements currently proposed in [1]. During session #47, concerns about these two items (“CXP messages over the air forwarding for inter-system communications” and “role and content of the centralized database in the system architecture”) were respectively addressed [2] in comments 530, 1008, 1127 & comments 409, 410, 1029.

This contribution tries to bring these two items together in a more general way by providing some preliminary material for discussing the relevance of both backhaul and over the air inter systems communications in the light of the current (or revised) system architecture. Hopefully, this contribution aims at helping the group to state on which inter system communications approaches (backhaul, over the air, or both) should be followed and wrt which elements of the current system architecture should remain or be removed. Progress on this point will help in the clean up and refinement of the text in D2.

Status/Discussions

D2 currently consider a coexistence architecture (Figure 1) composed of the following elements:

- at the BS level: CXP proxy + shared DB
- within the network (Country/regional level): Root Radius server/ Country/regional DB
- within the network (regional level): BSIS (administrated by the Service Provider)/Regional DB.
- within the network (regional level): RAIS (National Radio Administration) – no DB
- within the network (regional country/level): centralized server (it seems to be BSIS’s centralized server !?)

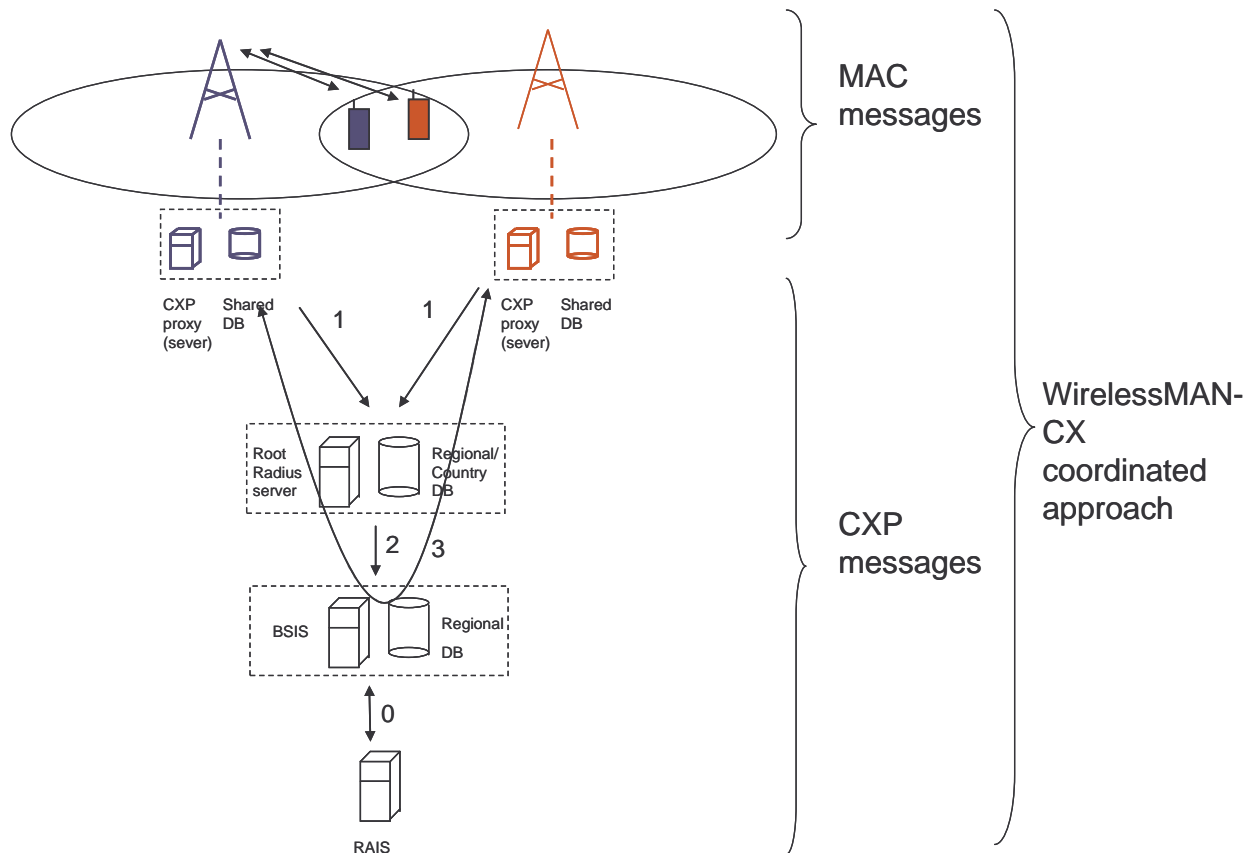


Figure 2: Coexistence architecture

Potential problems vs. solutions:

Problem: unavailability or unreliability of the IP network prevents/stops WirelessMAN-CS operations. Maybe more critical for inter-operators situation ?

Solution: define an over the air inter BS communication safe mode including simplified CXP messages. But which messages of Table 2 should be conveyed over the air?

Problem: Are the DB single or multiple operators? Which information is confidential or not? How is the CXP impacted in the inter-operators case?

Solution: TBD

Problem: It seems the BSIS/Radius and CMI/CSI substitute one another. Text for Radius server is not well developed.

Solution: Maybe, consider just one technique (CMI/CSI) and remove Radius server ?

Problem: it seems centralised DB = BSIS's DB, and distributed DB = shared DB

Solution: if centralized DB is considered, centralized DB could have a role (or any other) as proposed in the comment below. If centralized DB not relevant, remove centralized DB.

Problem: no DB is associated with RAIS

Solution: if Radius remains, its related regional/country DB could be common with RAIS's one.

Problem: where should regulatory related information should be handled?

Solution: RAIS server and country/regional DB instructs BSIS server/BSIS's DB

Table 1: MAC Messages

Type	Message Name	Message Description	Connection
67	BSD	Base Station Descriptor	Broadcast
68	SSURF	SS Uplink RF Descriptor	Basic
69	MADD	Master Advertisement Discovery Descriptor	Broadcast
70	SADD	Slave Advertisement Discovery Descriptor	Broadcast
71	ADPD	Advertisement Discovery Policy Descriptor	Broadcast
72	BS_CCID_REQ	Base Station Co-Channel Interference Detection Indication	Basic
73	BS_CCID_RSP	Base Station Co-Channel Interference Detection Response	Basic
74	CXP-REQ-MAC	Coexistence Protocol Request MAC message	Broadcast
75	CXP-RSP-MAC	Coexistence Protocol Response MAC message	Broadcast
76	OCSI_MNTR_REQ	CSI monitoring request message	Broadcast
77	OCSI_MNTR_RSP	CSI monitoring response message	Basic
78-255		reserved	

Table 2: CXP Messages

Code	CXP Message Name	CXP Message Type	Protocol type	Direction
0	Reserved	—	—	—
1	Identify Coexistence Request	CXP-REQ	TCP	BSIS->BSIS
2	Identify Coexistence Response	CXP-RSP	TCP	BSIS->BSIS
3	CoNBR Topology Request	CXP-REQ	TCP	BS-> BSIS
4	CoNBR Topology Reply	CXP-RSP	TCP	BSIS->BS
5	Registration Request	CXP-REQ	TCP	BS-> BSIS
6	Registration Reply	CXP-RSP	TCP	BSIS->BS
7	Registration Update Request	CXP-REQ	TCP	BS-> BSIS
8	Registration Update Reply	CXP-RSP	TCP	BSIS->BS
9	De-registration Request	CXP-REQ	TCP	BS-> BSIS
10	De-registration Reply	CXP-RSP	TCP	BSIS->BS
11	Add Coexistence Neighbor Request	CXP-REQ	TCP	BS->BS
12	Add Coexistence Neighbor Reply	CXP-RSP	TCP	BS->BS

13	Update Coexistence Neighbor Request	CXP-REQ	TCP	BS->BS
14	Update Coexistence Neighbor Reply	CXP-RSP	TCP	BS->BS
15	Delete Coexistence Neighbor Request	CXP-REQ	TCP	BS->BS
16	Delete Coexistence Neighbor Reply	CXP-RSP	TCP	BS->BS
17	Get_Param_For_Radio_Signature_Request	CXP-REQ	UDP	BS->BS
18	Get_Param_For_Radio_Signature_Reply	CXP-RSP	UDP	BS->BS
19	Evaluate_Interference_Request	CXP-REQ	UDP	BS->BS
20	Evaluate_Interference_Reply	CXP-RSP	UDP	BS->BS
21	Work_In_Parallel_Request	CXP-REQ	UDP	BS->BS
22	Work_In_Parallel_Reply	CXP-RSP	UDP	BS->BS
23	Reduce_Power_or_Quit_Sub_Frame_Request	CXP-REQ	UDP	BS->BS
24	Reduce_Power_or_Quit_Sub_Frame_Reply	CXP-RSP	UDP	BS->BS
25	Create_New_Sub_Frame_Request	CXP-REQ	UDP	BS->BS(MC?)
26	Create_New_Sub_Frame_Reply	CXP-RSP	UDP	BS->BS
27	SS_CCID_IND	CXP-REQ	UDP	BS->BS
28	SS_CCID_RSP	CXP-RSP	UDP	BS->BS
29	PSD_REQ	CXP-REQ	UDP	BS->BS
30	PSD_RSP	CXP-RSP	UDP	BS->BS
31	Channel Switch Negotiation Request	CXP-REQ	TCP	BS->BS
32	Channel Switch Negotiation Reply	CXP-RSP	TCP	BS->BS
33	Channel Switch Request	CXP-REQ	TCP	BS->BS
34	Channel Switch Reply	CXP-RSP	TCP	BS->BS
35	Advertisement Request	CXP-REQ	TCP	BS->BS
36	Advertisement Reply	CXP-RSP	TCP	BS->BS
37	Negotiation Process Request	CXP-REQ	TCP	BS->BS
38	Negotiation Process Reply	CXP-RSP	TCP	BS->BS
39	Credit Token Proposal Request	CXP-REQ	TCP	BS->BS
40	Credit Token Proposal Reply	CXP-RSP	TCP	BS->BS
41	Negotiation Results Request	CXP-REQ	TCP	BS->BS
42	Negotiation Results Reply	CXP-RSP	TCP	BS->BS
43	Granting Request	CXP-REQ	TCP	BS->BS
44	Granting Reply	CXP-RSP	TCP	BS->BS
45	Coexistence Conflict Identification Request	CXP-REQ	TCP	BS->BS
46	Coexistence Conflict Identification Reply	CXP-RSP	TCP	BS->BS
47	Intra Operator Coexistence Coordination Request	CXP-REQ	TCP	BS->BS
48	Intra Operator Coexistence Coordination Reply	CXP-RSP	TCP	BS->BS

49	Inter Operator Coexistence Coordination Request	CXP-REQ	TCP	BS->BS
50	Inter Operator Coexistence Coordination Reply	CXP-RSP	TCP	BS->BS
51	Final Coexistence Decision Request	CXP-REQ	TCP	BS->BS
52	Final Coexistence Decision Reply	CXP-RSP	TCP	BS->BS
53	Regulatory Authority Request	CXP-REQ	TCP	RAIS ->BSIS
54	Regulatory Authority Response	CXP-RSP	TCP	BSIS->RAIS
55	FREQ_AVOIDANCE Request	CXP-REQ	TCP	BSIS-BS
56	FREQ_AVOIDANCE Response	CXP-RSP	TCP	BS-BSIS
57	Master Subframe Switch Request	CXP-REQ	TCP	BS->BS
58	Master Subframe Switch Reply	CXP-RSP	TCP	BS->BS
59	OCSI backoff request message	CXP-REQ	TCP	BS->BS
60	OCSI backoff response message	CXP-RSP	TCP	BS->BS
61-255	reserved			

Specific editorial changes

This section provides a list of changes to the draft document.

Blue text represents specific editorial additions.

~~Red strikethrough~~ text is to be deleted.

Black text is text already in the draft.

Bold italic text is editorial instructions to the editor.

References

- [1] IEEE 802.16h/D2: Part 16: Air Interface for Fixed Broadband Wireless Access Systems Amendment for Improved Coexistence Mechanisms for License-Exempt Operation; 2007-01-30
 [2] IEEE 80216h-06_068r5: Letter Ballot #24 Commentary file with resolutions from Session #47.

Annex

This annex contains the comment from [2] to be resolved via these action items covered by the contribution.

Comment 530:
 (Phillip

Barber)

Page:

999

Line:

Subclause:

Comment:

Many of the 'detection' methods at BS power-up and channel selection require detection of SS UL transmissions to an adjacent co-channel or adjacent channel BS. What if the boundary SS does not have UL transmission requirements/makes no UL transmissions during the BS detection interval? This seems very likely to me. Also, the BS powering-up will only here the SS transmission in the UL subframe. How can the powering-up BS interpret the entire frame structure of the other BS transmissions? What about synchronizing in time? How can the powering-up BS know the transmission offset of the affected SS UL transmissions to the other BS such that the powering-up BS can correctly know the other BS absolute transmission timing? What if there are five affected SS, each differently affected and with different offsets?

Suggested

No text

Remedy:

provided

Resolution:

To be addressed by adhoc for inter-system communication consolidation chaired by David. (from the resolution of comment 1008 1127 within 80216-06_068r3)

Comment 1008:

(Mariana Goldhamer)

Page: 37

Line: P42

Subclause: 15

Comment:

It was indicated the need for faster inter-system (802.16 systems) communication.

1. that communication and the associated messages needs to be identified (see contribution 802.16h/07)
2. It is needed to identify a communication profile or max two profiles (OFDM,OFDMA) including parameters as channel width, PHY characteristics, etc.

Suggested Remedy:

See as a start the contribution IEEE C802.16h-07/d006, which is also a solution to the comment 86 and the corresponding Ad-Hoc.

Resolution:

Ad hoc for forwarding the CXP message over the air. Chair -David.

Comment 1127:

(John Sydor)

Page: 10

Line: P34

Subclause: 6.3.2.3.63

Comment:

Section 6.3.2.3.63 needs updates, more information on antenna radiation patterns, Some material needs to be moved to section 15 .

Suggested Remedy:

See contribution IEEE c802.16h-07/014

Resolution:

accept the contribution 014 with discussion goes into David adhoc AI for consideration on the inter-system communication.

Comment 409:

David Grandblaise

Comment:

The information table for the centralized database is empty. The centralized database is not described in the overall architecture depicted in subclause 15.1.6. Only the distributed database is depicted. Currently, only the distributed database is involved in the CXP.

Compared to the distributed database, the role of the centralised database has to be defined before the information table is filled. The centralised database could be the country database. This centralised database could be an instantiation of the distributed database at a given time and in a given region for a given set of information (not confidential). With respect to this, the centralised architecture could be operator specific containing the confidential operator data, and only the non confidential content of centralised database could be stored and be accessed in the distributed database. Then, the CXP would rely on the information stored in the distributed database.

Additionally, the centralised database information could play as data information backup for the distributed database. Information refreshment in the centralised database would be less frequent than the distributed database, and the centralised database content would be regularly updated by the distributed database on a solicited or unsolicited fashion.

Also, the RAIS ("Radio Application Identification Server" defined in subclause 15.5.2.53 page 143) could be used jointly with the centralised database. The RAIS could provide some information to the centralised database and the centralised database could propagate this information as appropriate to the distributed database to meet local regional requirements.

Suggested Remedy:

Define the role of the architecture and provide the corresponding message

Resolution:

AI taken by Mariana and David on centralized server content for regulatory purposes.

Comment 410:

Xuyong Wu

Comment:

Define the information table contained in the centralized database. Or deleted the whole section.

Suggested Remedy:

None

Resolution:

AI taken by Mariana and David on centralized server content for regulatory purposes.

Comment 1029:
Kenneth Stanwood

Comment:

We already need to handle the case where a centralized database doesn't exist and the BSs build the info via messages over the backhaul. Also, there is no way to control the content and accuracy of a centralized database. If one exists, the BS is free to use it, but it's outside the scope of the standard.

Suggested Remedy:
Delete section 15.3.3.2

Resolution:
by AI taken by Mariana to define the centralized database.