

MAC

A Study on the MAC Protocol to Reduce the Delay Time in Aeronautical Mobile Communication

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LAN IEEE 802.11 CSMA/CA

CSMA/CA

IEEE 802.11 (MAC, Medium Access Control) (PCF DCF)

DCF 가

Wireless Window Protocol 가

5 6

CSMA/CA

PCF , DCF

가

[1][9][10]

I.

가

가

IEEE 802.11 CSMA/CA

DFWMAC CSMA

(Carrier Sense Multiple Access) MACA(Multi-
ple Access with Collision Avoidance)

(Dept. of Electronic Engineering, Inha University)

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2-1

MAC .[2][3] , DFW-

DFWMAC DCF(Distribution Coordination Function) PCF(Point Coordination Function)

(CFP) (CTP) 가 ,

DCF . DFWMAC PCF

가 PCS, ATM 802.11

802.11 DFWMAC 가 ,

DFWMAC IEEE 802.11 MAC DFWMAC 가 , PCF DCF , IFS

LAN 4가 . ABR(Available Bit rate), VBR(Variable bit rate), CBR(Constant Bit Rate), UBR(Unspecified bit rate) , ABR

. VBR , VBR VBR . CBR 가 가

. DFWMAC CBR PCF , UBR ABR

가 DCF , ABR, UBR 가 가 , 가

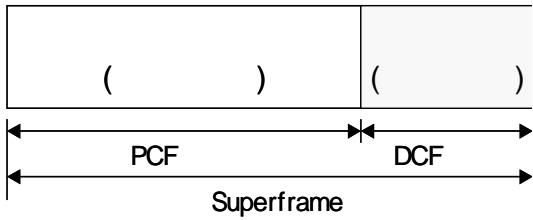
2-2 PCF DCF

DFWMAC (CBR VBR)

PCF (VBR ABR, UBR) DCF

DCF ,

Backoff 가 Backoff



1. PCF DCF

Fig. 1. Period Allocation between PCF and DCF



가
DCF

[2] , PCF

2-3

IFS(InterFrame Space)
IFS

DIFS (Distributed coordination function InterFrame Space) PIFS (Point coordination function Inter Frame Space) , SIFS, EIFS가

. DIFS DCF

PIFS PCF

, SIFS

, EIFS

. PIFS DIFS

PCF DCF

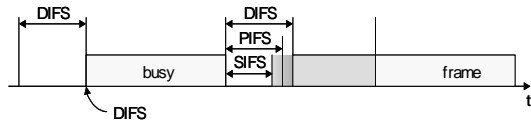
, 2 DIFS

PIFS

PCF

DCF

. IFS



2. IFS(InterFrame Space)

Fig. 2. Some IFS Relationships

EIFS<SIFS<PIFS<DIFS

[2]

2-4

DCF

Backoff

Backoff

Back-

off

[2]

3

Backoff

3

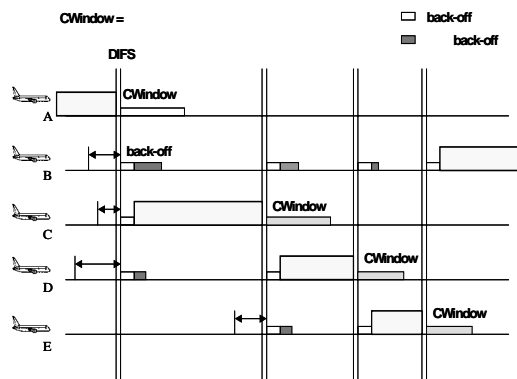
Backoff

가 가

D

D

Back-



3. Backoff

Fig. 3. Backoff Delay Procedure

off , WWP 가

Backoff .

가 가 가 .

Backoff 0 1 ,

DFWMAC . WWP

가 (, ,)

.[4][7] 가 ,

4 , WWP

. WWP

IEEE 802.11 가 , , , ,

가 Backoff .

Backoff 0 , 0 1

가 ,

가 L U , L 0

Window Protocol(WWP) , Wireless U 1 .

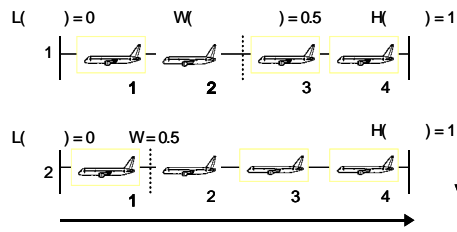
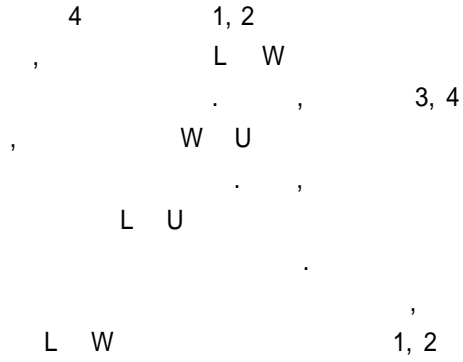
DCF L W U

가 Backoff

Backoff 가 ,

3-1 WWP(Wireless Window Protocol)

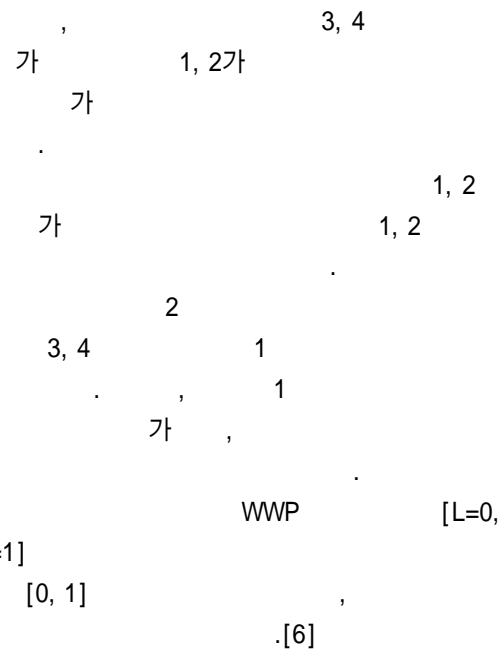
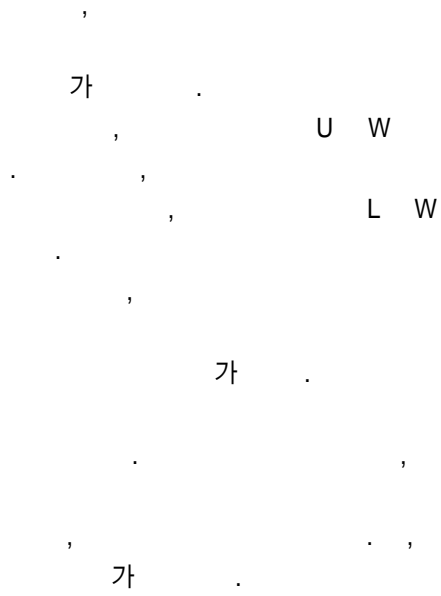
4. WWP Fig. 4. WWP Protocol Procedure



$W(0.5) - U(1) :$
 $L(0) - W(0.5) :$

5. 1/2

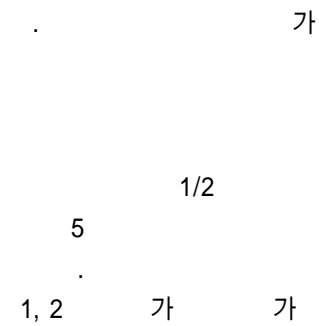
Fig. 5. Group Selection by Probability 1/2.



3-2 WWP

WWP

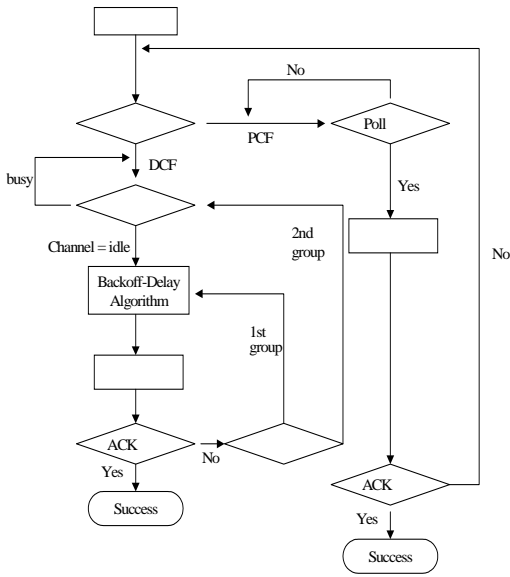
1/2



3-3

Backoff





6. Fig. 6. State Flowchart

1. Table 1. Simulation Parameters

	2.4 ms
SIFS	1.2 ms
PIFS	3.6 ms
DIFS	6.0 ms
	200 bytes
ACK	15 bytes
	6 ms
	100

1

ACK

DFWMAC

2-Way CSMA/CA

[5]

7

가 가

DFWMAC

Pure ALOHA,

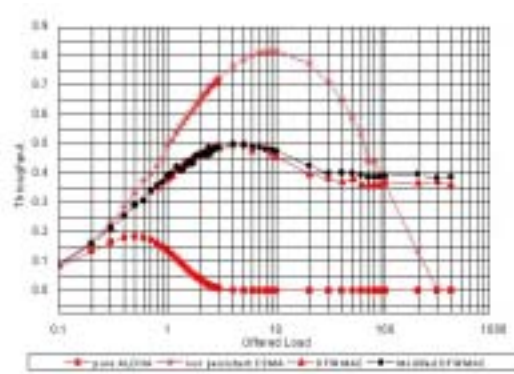
Non-persistent CSMA

DFWMAC

7

DFWMAC non-persistent CSMA

가 가 100



7.

Fig. 7. Throughput Analysis versus Offered Load G

DFWMAC PCF

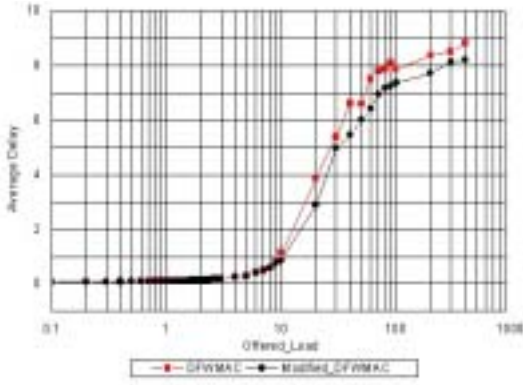
, DCF

DFWMAC

3, 4 가

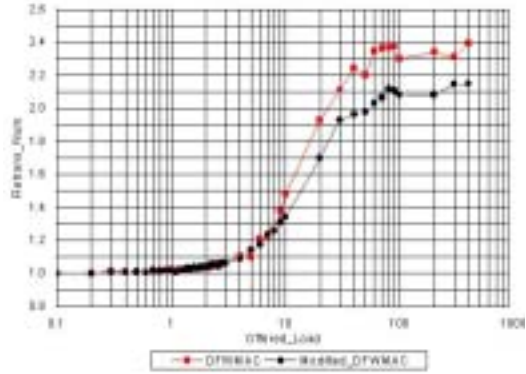
6

WWP가



8.

Fig. 8. Time Delay versus Offered Load G



9.

Fig. 9. Retransmission Number versus Offered Load G

, non-persistent CSMA가 S가 0.36
 DFWMAC S가 0.379
 G가 10
 S 0.454 DFWMAC S
 0.472

G가 10 , 가 1.458
 DFWMAC 1.372
 G 가
 WWP
 G=10
 가

DFWMAC
 가

8

가

8 ALOHA non-persistent CSMA
 DFWMAC

LAN
 IEEE 802.11 CSMA/

DFWMAC
 DFWMAC ALOHA CA

7

DFWMAC

가

, G가 가 10
 DFWMAC 1.157ms
 DFWMAC 0.973ms

. CSMA DFWMAC
 DFWMAC
 가

9

WWP

G가 10

가

가

1/2

가

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(金勇中)



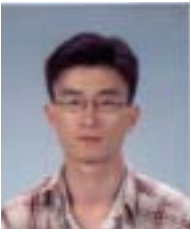
1996 2 :
 ()
 1998 2 :
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 1998 2 - :

(姜錫燁)



1997 2 :
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 1999 2 :
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 1999 2 - :

(林亨烈)



1999 2 :
()
2001 2 :
()
2001 2 - : LG

: ,

(朴孝達)



1978 2 :
()
1987 : ()
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1992 - :

: ,