DiffServ   CDMA Network
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Performance Evaluation of CDMA Network with DiffServ

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Circuit Switching   .   Fully Packet
Switching   ,   Channel Utilization Model
. DiffServ
,   Simulation   .

1. Introduction

(Mobile Communication)   2   , 2.5   , 3
Communication Termianl

Node   IP   .
.   All IP Environment   ,
All IP
Circuit Switching
,
.

,

.

All IP   , CDMA Network
IP Packet
.   Voice   Channel   Data
Channel   , Packet   Data
Packet   ,   Voice
Channel   .
DiffServ
.   DiffServ Network
Infrastructure   ,
QoS   .
.
100%   ,
.

2. CDMA Network Channel
Utilization Model

2.1 CDMA

CDMA   2

.

2

2
.
CDMA   Forward Channel   Reverse Channel   2
.

2.2 Forward Channel

Forward   Channel   (Base   station)   (Mobile
Station)   Channel   ,   Channel
.

- Pilot Channel(1   ) :   1   ,
. W0   .   Pilot Channel

- Sync Channel(1   ) : W32 1   .
.   ,   ,
Paging channel

- Paging Channel(7   ) :   .
7   .
,   ,

- Traffic Channel (55   ):

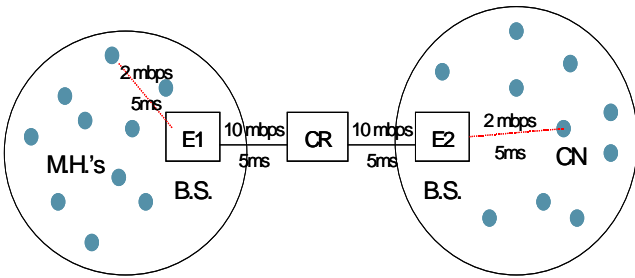## 2.3 Reverse Channel

Reverse Channel

Channel ,   .

● Access Channel :

.   ,   ,   ,

. 4.8Kbps

● Traffic Channel :

3. Simulation Model

.

1   Base Station   Edge Router   ,
Wired CDMA Network   Core Router   .
Diffserv   , Router
        RED
. Wired Router   10mbps   5ms   link
latency   ,   2mbps
    5ms   link latency   . Packet Size   Voice
    50 byte   1000byte   .

1 Simulation Topology with Diffserv

ns-2   , ns-2
        Differentiated Services   Mobile Network
. DiffServ
    Packet Drop Ratio   Jitter   .

3.1 Model Without Diffserv

CDMA Network   Circuit
Switching   , Voice Channel   Data Channel
.   Voice Quality
            Model   Voice Quality
.   Link Bandwidth   8:2(Voice:Data)
.

3.2 With Diffserv

Bandwidth   Voice, Data   .
Diffserv   Bandwidth   .
Traffic   8:2(Voice:Data)   . Diffserv   Service
Level   4 (DS Code : 10, 11, 20, 21)   . Overloaded
Traffic   . Normal Operation
            Quality   .
                CDMA Network
. Link Latency   CDMA   Channel
Modelling   .   ,
.

4. Evaluation of Simulation

4.1 Packet Drop Ratio

Packet Drop Ratio   . Voice Packet
Quality   Packet Drop Ratio
.

Total Packets	Dropped Packets	Drop Ratio
79989	20321	28.9 %

1 Diffserv   Packet Drop Ratio

1   Diffserv   ,
Overloaded Traffic   28.9%   Packet Drop Ratio
.

2   Diffserv   Service
Level   Packet Drop Ratio   . Total
Drop Ratio   Diffserv   9.5 %
    ,   Edge Router
.

CodePoint 11   (10, 20, 21), Drop Ratio 6.2%
    ,   . CodePoint 11
Traffic   62%   80%   Voice
Packet   , Voice Packet
    SLA(Service Level Agreement)   ,   Voice
Quality   .

CP	Total Packets	Dropped Packets	Drop Ratio
All	79989	29951	37.4 %
10	10008	121	1.2 %
11	29986	24248	80.8 %
20	10008	0	0 %
21	29987	2983	9.9 %

2 Diffserv   Packet Drop Ratio

4.2 Jitter

Jitter   Voice   Quality   .
Circuit Switching Mode   Jitter

     .   , All IP   Packet   Packet
routing   ,   router   Jitter
                     .

     Diffserv   Packet Jitter   0.16ms   .
     Diffserv   3
               Diffserv   jitter
     ,   CP   .

CP	Jitter
All	0.19
10	0.05
11	0.22
20	0.02
21	0.09

     3 Diffserv   Jitter

Packet Drop Ratio   CodePoint 11
     Jitter   3   Jitter
                              .   ,

   Hop   ,
                         .

5. Conclusion and Future Work

                    All IP
          ,   Voice
Quality
Diffserv   .
  ns-2 Simulator   Diffserv   CDMA
Packet   Diffserv   CDMA Packet
               .   Packet Drop Ratio
Jitter   , Diffserv   , Service Level
                        .

Packet   Diffserv
                          .

                    (Topology)
               .   , Wired Network(Diffserv
Network)   topology   ,
               .

          All IP   CDMA
               Voice Quality

Diffserv
     .

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