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**ПРОФЕСІОНАЛИ
МАЙБУТЬОГО**  **МТС**
СТВОРЮЙ МАЙБУТНЄ РАЗОМ З МТС



«

Triple Play»

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IV
: « »
« »:
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: . . . , « »
» () .
:
. . . , ;
. . . , , ;
-10 .

« »

	4
1	5
2	5
3	6
3.1	6
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Triple Play —

(« »):

Triple Play, (VoIP), (IPTV), (VoD), (Cloud Computing), « », NGN [1]. NGN Triple Play. Triple Play. Triple Play, QoS, [2]. Triple Play, QoS, Triple Play

:

1)

Triple Play;

2)

Triple Play;

3)

;

4)

Triple Play;

5)

1

•

Triple Play.

•

QoS

Triple Play.

•

QoS.

•

•

Triple Play.

•

2

3.1

3.1.1

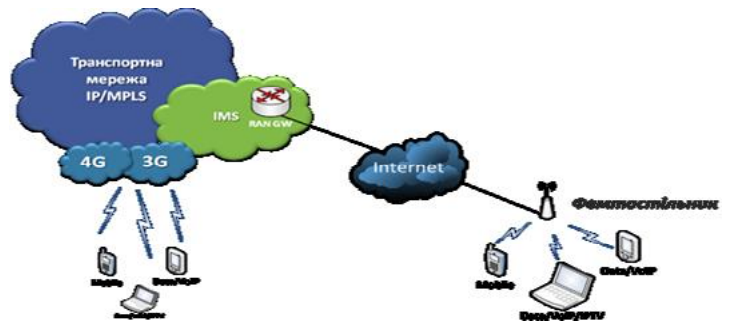
Triple Play

(24 /)
« ».

GPON/FTTx;
UMTS/HSPA+MIMO, LTE, WiMAX.

GSM/EDGE (1900),
(Cisco VNI), 60-70%

[3]



.3.1.

15 50 .

(. 3.1).

RAN-Gateway,

« »

3.1.2

QoS.

IP/MPLS (NG-SDH, ATM, GE).

IP/MPLS

« » 2009 .

3.1.3

Triple Play

Softswitch/IMS [4].

IMS

SIP.

IMS [4].

IMS,

— SO-IMS [5]. SO-IMS

SO-IMS

QoS,

IMS

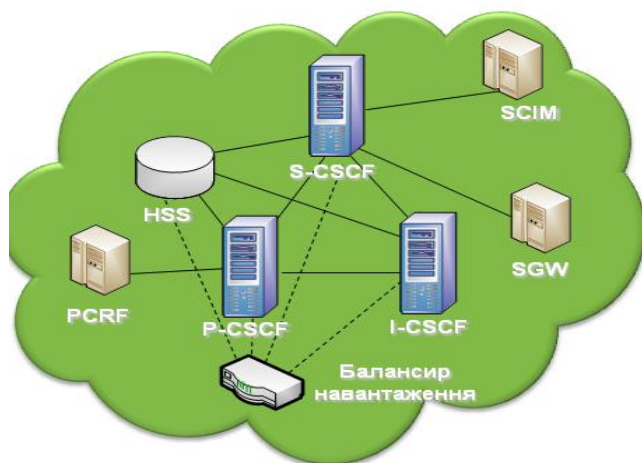
(. 3.2).

SO-IMS

SIP-

P-CSCF

[5].



. 3.2.

SO-IMS

-CSCF

:

(, -CSCF)

P-CSCF [5].

SO-IMS

S-CFCS,

SO-IMS

I-CSCF

S-CSCF,

[6].
S-CSCF

I-CSCF

P-CSCF S-CSCF.

. 3.4.

3.1.4

Triple Play

SDP [7].

(SDE), (SCE), (SME), (SEE), SDP

(API), , Parlay API, Parlay X API, SIP API.
SDP

SDP

Product Lifecycle Management), (PLM —

[7].

SDP,

QoS.

(. .3.3 3.4).

3.2

Triple Play

[8,9],

Triple Play

QoS

(VoIP,);

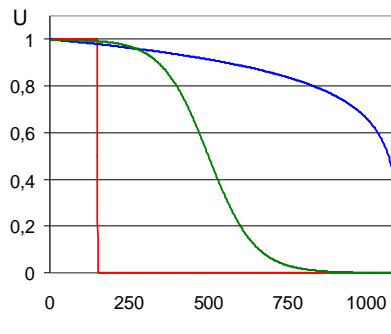
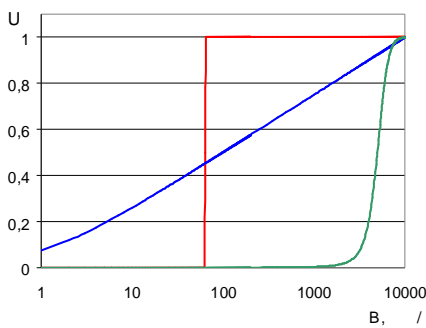
(,);

(IPTV, VoD).

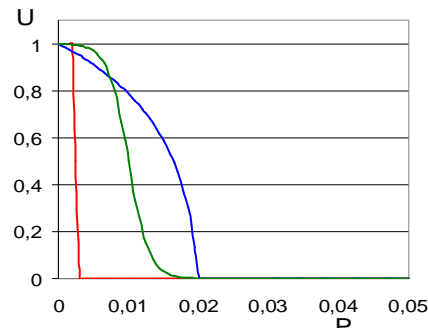
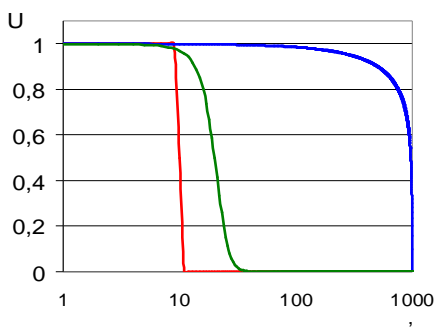
QoS [2].

U [8,9],

QoS,



:
(), -
(τ), (Δt),
().
U
. 3.3.



— — — — —

. 3.3.

QoS

:

$$D = Y \sum_{i=1}^3 p_i \cdot V_i \cdot u_{B_i}(B) \cdot u_{\tau_i}(\tau) \cdot u_{\Delta t_i}(\Delta t) \cdot u_{P_i}(P) = Y \cdot U(B, \tau, \Delta t, P), \quad (3.1)$$

D — ; Y —

; p_i — i - ; V_i —

; $u_{B_i}(B), u_{\tau_i}(\tau), u_{\Delta t_i}(\Delta t), u_{P_i}(P)$ —

, , - ; $U(B, \tau, \Delta t, P)$ —

).

$$(3.1)$$

3.3

- NGN. QoS,

3.3.1

QoS QoS, τ

[10] W, τ ([10]:

$$\tau = \tau + \frac{W \cdot \tau}{1 - W} \quad (3.2)$$

, τ QoS, NGN.

(P) ()

[11]:

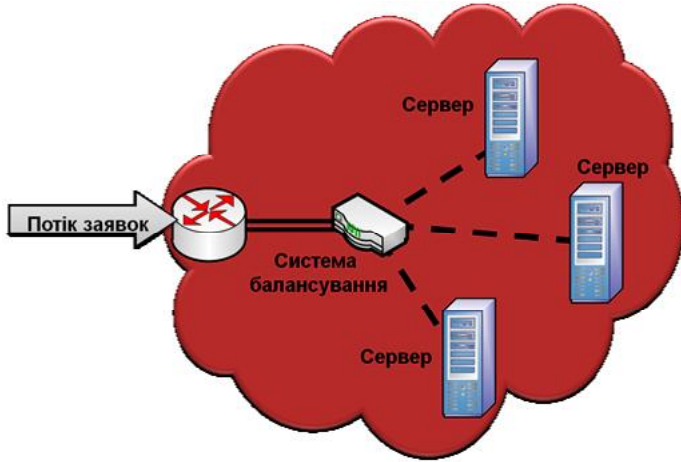
$$P = \frac{e^{-(V-A)\mu\tau}}{\frac{1}{E_v(A)} + \frac{A}{V-A}(1 - e^{-(V-A)\mu\tau})} \quad (3.3)$$

V- ; μ - ; $E_v(A)$ -

QoS

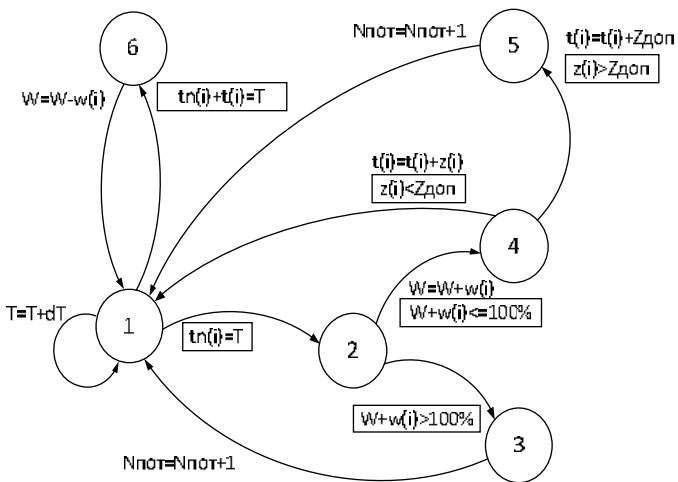
(. . 3.4).

3.3.2



3.4.

. 3.4.



(. 3.5).

. 3.5.

3.4

- Triple Play

1) ;
2) ;

().

3.4.1

- VoD

VoD

3.4.2

- Round Robin);
- (Least Connection, Least Load).

NGN

Triple Play

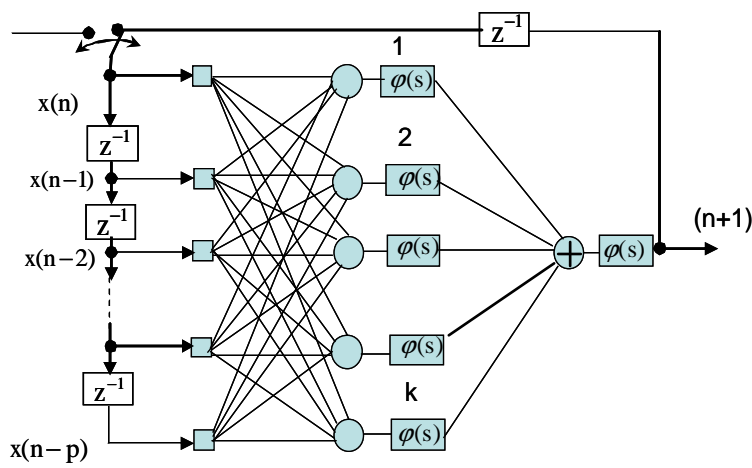
m

p

3.4.3

[12],
(3.6).
« - ».
BIBO-
[12].

[12].



. 3.6.

(n+1) :

$$x^*(n+1) = f(x(n), x(n-1), x(n-2), \dots, x(n-p)).$$

:

$$x^*(n+1) = \varphi\left(\sum_{j=1}^k \left[\omega_j \varphi\left(\sum_{l=0}^p \omega_{j,l} x(n-l) + b_j\right) + b_0\right]\right).$$

x(n+2).

m

p,

(

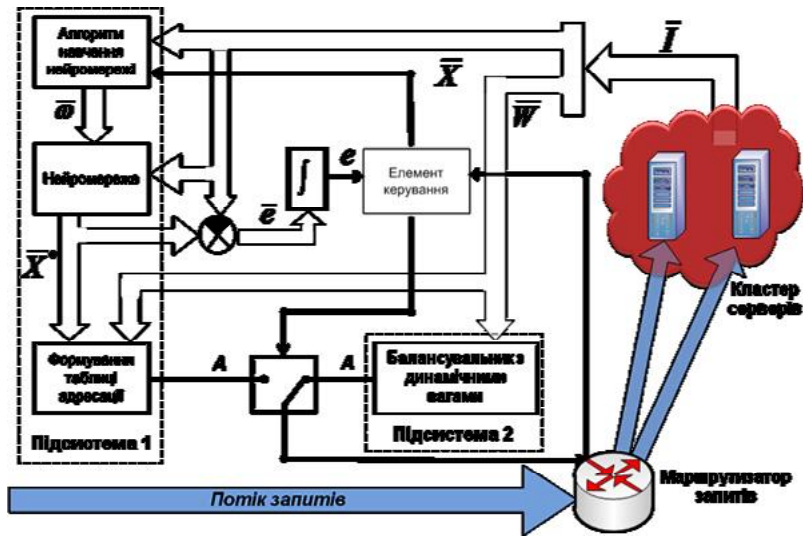
)

p > 2m, m

3.4.4

(. 3.7).

1



.3.7.

$$\bar{X} = \{x_n, x_{n-1}, \dots, x_{n-p}\}.$$

(Round Robin).

$$\bar{I} = \{\bar{W}, \bar{X}\}$$

T.

$$\bar{W} = \{w_1, \dots, w_s\}$$

()

Round Robin

(2).

$\bar{\omega}$,

e

Round Robin,

Round Robin

2

:

$$K_i = \frac{k_i}{\min_{j=0..s}(k_j)}, \quad (3.4)$$

k_i —

, K_i —

1,

m-

$$\bar{X}^* = \{x_{n+1}^*, x_{n+2}^*, \dots, x_{n+m}^*\},$$

Least Load,

2.

e,

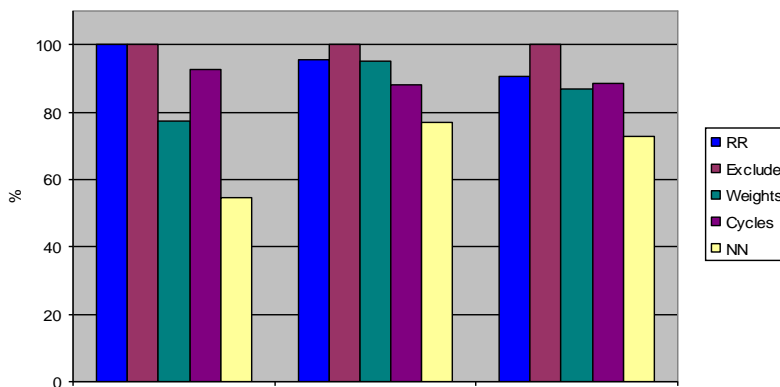
2

3.5

CodeGear RAD Studio 2007 ++.

Round Robin (RR), Exclude, Weights, Cycles,

(NN).



.3.8.

.3.8.

QoS

100%

Round Robin

22%,

3.2

16%.

4

-
-
-
-
-

IMS.

SDP.

RAN-gateway

Triple Play

NGN

Triple

Play.

(GPON)

(UMTS/HSPA+MIMO, LTE,

WiMAX).

SO-IMS

P-CSCF S-

CSCF.

SDP,

Triple Play

QoS

QoS

22%,

47%

Triple Play

16%.

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- 10.
- 11.
- 12.