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A 31 O 2004

Abstract

T : . H , - . T , . T , . E ; ; . T .

Keywords: M - ; A ; T ; G ; S

1. Introduction

M - , . M - -[1]. H , - . I , - , -[2]. N - , , , - , PKI, .-[3]. I , , . W *Central Trust Mechanism*, T A (TA) . C T M , , , , TA , . O , C T M - .

T C T M , D T M -[4,5]. T - PGP , , -[6]. I -[7], M O S - , ; , . H , -[7] . M , K . -[3]

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, .

I - , , ; , [4].

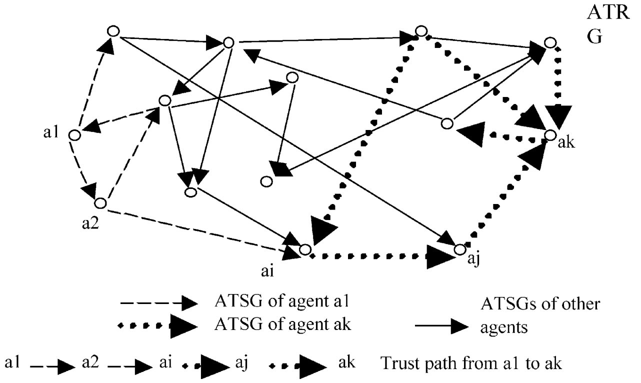
O , , , each time ; . T , D T M , . S - .

M , [8], - . T D T M - , . T , . O , , , . T , *Autonomous Trust Management* - [6].

S C . - - , - , , [9,10].

W - R . [9] , - , . I , ; ; . T - .

I , *a*



F . 1. I ATRG, ATSG ATP.

F . 1 . T , :

- (ATSG) ;
- - , ATSG , ;
- ATSGs, , ;
- , ATSGs ;
- , .
- , . H , , .

3. Autonomous trust management model

3.1. Combination of agent trust sub-graph

A , - , , . T , ATSGs.

T ATSGs : , ATSG. T ATSG .

E , ( ) .

I , . A , ATSGs.

I ATSGs, . I , .

F . 2 , ATSGs a_1 a_2.

T ATSG : *headnode* , *edgenode* *headnode*.

B C -[5 , ATSG .

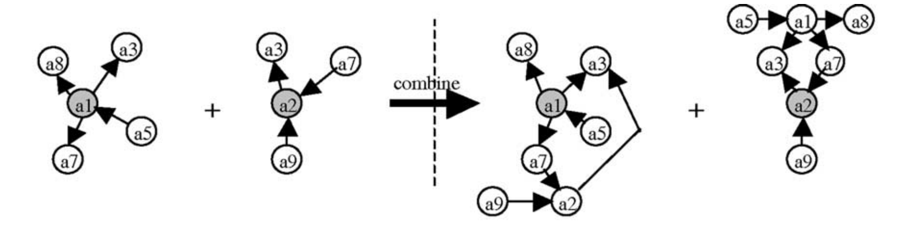
```
typedef struct node
    {agenttype trusting_agent;
        struct node *trust;
    } edgenode;
typedef struct
    {agenttype agent;
        edgenode *trust;
    } headnode;
headnode ATSG[n];
```

T , ATSG a_1 F . 2 F . 3.

T A 1.

A 1

```
Void Combination (headnode ATSGi[M],ATSGj[N])
/*Comine ATSGj into ATSGi*/
{
headnode ATSGi[m], ATSGj[n];
edgenode *temp, *point1;
edgenode *newedgenode;
```



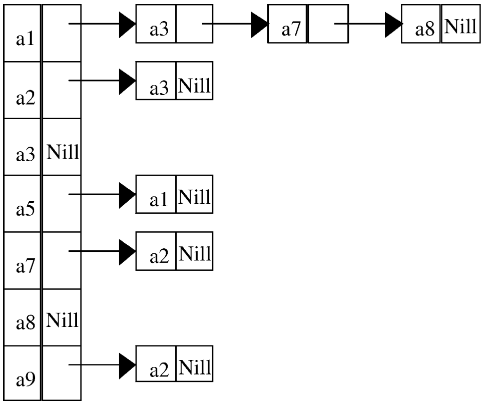
ATSG in a1 before combination

ATSG in a2 before combination

ATSG in a1 after combination

ATSG in a2 after combination

F . 2. C ATSG .



F . 3. M ATSG a_1.

```
headnode *newheadnode;
int k,b;
for (int i=0;i<n;i++)
   {
   /*Combine the agents trusted by ATSGi into ATSGi*/
   for (int j=0;j<m;j++)
   {if ATSGi[j].agent==ATSGj[i].agent
      {temp=ATSGj[i].trust;
      point1=ATSGi[j].trust;
      while temp !=nill
      {b=0;
      while (point1.trust != nill) && (b==0)
      {if point1.trusting_agent=temp.trusting_agent
         b==1;
      point1=point1.trust;
      }
      if b==0
         {new newedgenode;/*create a new edgenode*/
         newedgenode.trusting_agent=
         temp.trusting_agent;
         newedgenode.trust=ATSGi[i].trust;
         ATSGi[i].trust=newedgenode;
         }
      point1=ATSGi[j].trust;
      temp=temp.trust;
      }
   }
   }
   /*Combine the agents that trust ATSGi into ATSGi*/
   temp=ATSGj[i].trust;
   while temp!= nill
   {for (j=0;j<m;j++)
      {if temp.trusting_agent==ATSGi[j].agent
         {m++;new newheadnode;/*create a new
         headnode*/
         newheadnode.agent=temp.trusting_agent;
         newheadnode.trust=ATSGj[i].trust;
         ATSGi[m]=newheadnode;
         temp=nill;
         j=m;
         }
      };
      temp=temp.trust;
   }}}
```

F A 1, $O(n_2m_2)$, .

3.2. Construction of trust relation

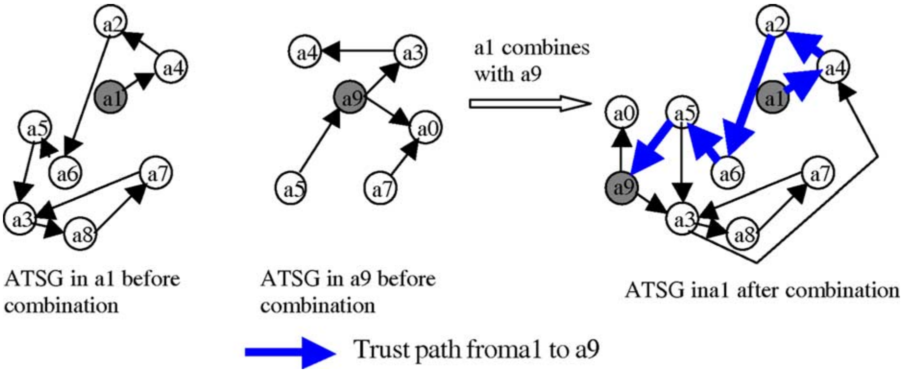
I *i* *j*, *j*. T : , . . *i* *j*; , .

3.2.1. Searching for trust path

T -[1 , .

I *i* *j*, *i* ATSG *j*' . T *i* *j* ATSG. F . 4 a_1 a_9.

T A 2.



F . 4. A .

A 2

```
int TrustPath_Searching (agenttype ai,aj; headnode
ATSGi[m],ATSGj[n])
/*for simplicity, next we denote the headnode or
edgenode that contrains agent a as
node(a), and describe the data struct both of headnode
and edgenode as node*/
{node *temp;
    int b=0;
    stack s; /*define a variable of stack data structure*/
    combination (ATSGi, ATSGj);
    push (s,node(a));
    while (!empty(s) and (b==0))
    {temp=pop(s);
    if temp==node(aj)
        B=1;
    while temp!=nill
    {temp=temp.trust;
        push(s,temp);}
}
return (b);}
```

I i j, j , S 3.2.2.

3.2.2. Automated negotiation of trust

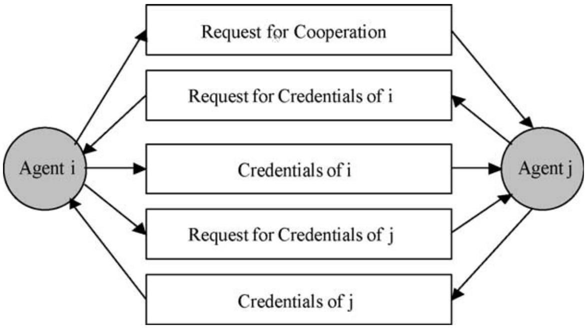
I i j, j . I , . H , , , .

A - -[3 , . C i j , .

A : , ' ' -[4 . I , .

F . 5 .

I i j , ATSG i j.



F . 5. A .

3.3. Revocation of trust

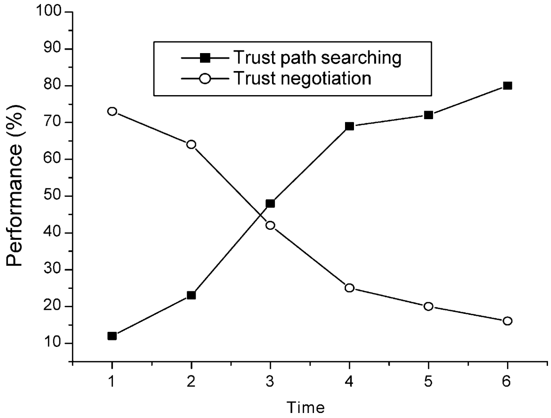
E : ATSG . O . A , FIFO ( ), NUR (N), LRU (L U), . A , i j , ATSG i j , ATSG .

4. Simulation experiments

F , . W T /T , T , T B -[7,18 . A A S D K 2 (O S) -[9 . I , , , CPU . T , , , S 4.1 4.3.

4.1. Trust path searching vs. trust negotiation

F , . W , . I - , . I , , ,



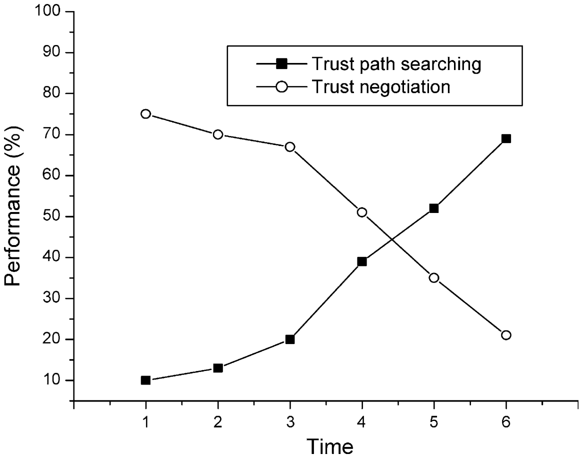
F . 6. N =5.

. T F . 6 9.
F , :

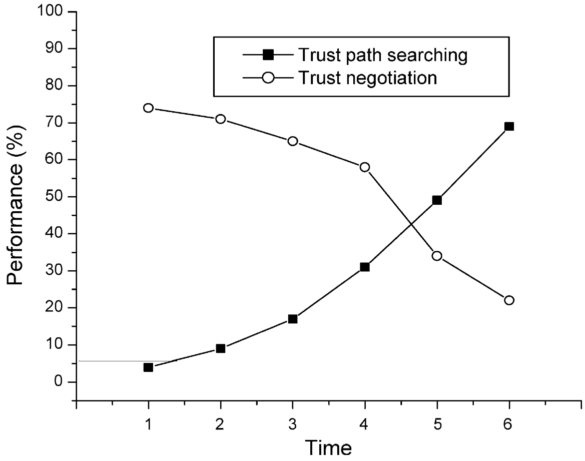
- , ATSG , ATSG. T , , ;
- , ATSG . T , ATSG ;
- ' , ATSG . T , - .

4.2. Trust construction among the agents on the same host vs. trust construction among the agents on different hosts

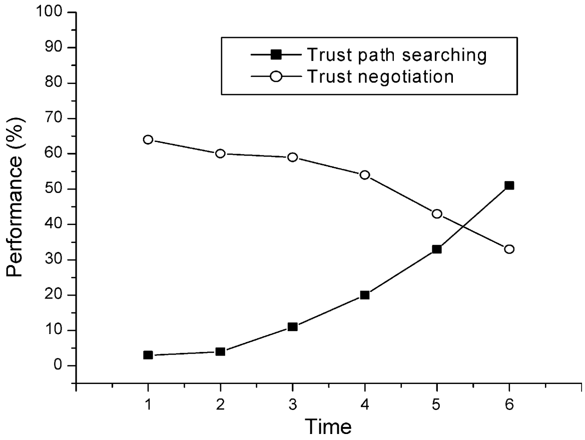
I - ,



F . 7. N =10.



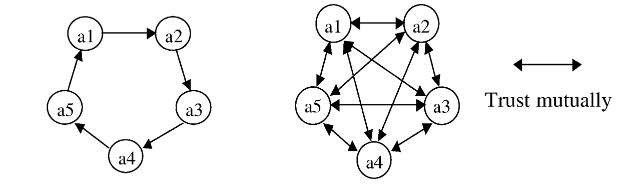
F . 8. N =15.



F . 9. N =20.

. O , - , , . N .

I , . T F . 10( ), a_1 a_2, a_2 a_3, a_3 a_4, a_4 a_5, a_5 a_1; F . 10( ), . I , .
F ,



(a) The initial trust relations (b) The final trust relations

F . 10. T .

,
T 1. N
T 1
F . 10.

I , ,
$a_{(i+1)mod5}$ $a_{(i+4)mod5}$.
T
F . 11.

F F . 11,
. T
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W
, ,
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4.3. Autonomous trust mechanism vs. distributed trust mechanism

I , . S
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W ;
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I ,
. I -
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. I ,
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I , ,
. T
F . 12
-38 0.1( )936.5(2(N81.

5. Conclusion

I , - , - . T - . O - , . W , - - . O - .

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