MANAGING ATM NETWORKS

Aiko Pras
CTIT
University of Twente
the Netherlands
email: pras@cs.utwente.nl
http://www.ctit.cs.utwente.nl/~pras
ATM

GUARANTEED QUALITY OF SERVICE

PVC: PERMANENT VIRTUAL CONNECTION
SVC: SWITCHED VIRTUAL CONNECTION

• UNSPECIFIED BITRATE (UBR)
• CONTINUOUS BITRATE (CBR)
  • VARIABLE BITRATE (VBR)
• AVAILABLE BITRATE (ABR)
CONTINUOUS BIT RATE

# cells/s

Time

Peak Cell Rate
VARIABLE BIT RATE

# cells/s

Peak Cell Rate

Burst Size

Sustainable Cell Rate

Time
AVAILABLE BIT RATE

# cells/s

Peak Cell Rate

Minimum Cell Rate

Time
OTHER PARAMETER ISSUES

• CELL LOSS PRIORITY

• TAGGING

THERE ARE 20 POSSIBLE PARAMETERS

CONFIGURING ATM CONNECTIONS IS DIFFICULT!
WHO CONFIGURES THE CONNECTION

• HUMAN USER
  E.G. UT-ATM TOOL

• APPLICATION PROGRAMME
  E.G. NetMeeting
PROBLEMS

• USER MAY NOT KNOW THE AMOUNT OF BANDWIDTH THAT IS BEING USED

• DENIAL OF SERVICE
THERE MUST BE SOME FORM OF SUPERVISION!

MANAGEMENT
MANAGEMENT

PREVENT  CONNECTION  INTERVENE  SEND BILL

Time
MANAGEMENT

PREVENT

CONNECTION

INTERVENE

SEND BILL

Time
CONNECTION ADMISSION CONTROL
CONNECTION ADMISSION CONTROL

• CAPACITY OF SWITCHES
  • CAPACITY OF LINES

MULTIPLE LEVELS, E.G.:
  • USE CURRENT PARAMETER VALUES
  • USE STATISTICAL INFORMATION OVER LAST MINUTES
  • USE STATISTICAL INFORMATION OVER LAST DAYS
POLICY CONTROL
MANAGEMENT

PREVENT  CONNECTION  INTERVENE  SEND BILL
ABORT EXISTING CONNECTIONS

MANAGER

SNMP

SWITCH

MIB

<table>
<thead>
<tr>
<th>FROM</th>
<th>TO</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>C</td>
<td>D</td>
</tr>
</tbody>
</table>
ABORT EXISTING CONNECTIONS

<table>
<thead>
<tr>
<th>PORT</th>
<th>VPI</th>
<th>VCI</th>
<th>PORT</th>
<th>VPI</th>
<th>VCI</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>12</td>
<td>2</td>
<td>1</td>
<td>13</td>
<td>2</td>
</tr>
</tbody>
</table>

PARAMETERS

USER

A
B
C
ACCOUNTING

SWITCH

MIB

SWITCH

MIB

SWITCH

MIB

METERING

CHARGING

BILLING
METERING

• WORKING DOCUMENTS WITHIN IETF

• IETF PROPOSALS NOT YET IMPLEMENTED

• PROVIDER SPECIFIC SOLUTIONS
CHARGING

NO OPEN STANDARDS
BILLING
SETTLEMENT WITH PRECEDING PROVIDER
BILLING
SETTLEMENT WITH ORIGINATING PROVIDER
BILLING
SETTLEMENT WITH ORIGINATING USER
BILLING
CENTRAL BILLING SYSTEM
BILLING
CONTENT PROVIDERS

Central Billing System

Provider

Provider

Provider

Content Provider

Electronic Shop

Electronic Magazine

User
SUMMARY

• CONNECTION ADMISSION CONTROL: OK

• POLICY CONTROL: NOT AVAILABLE

• ABORTING CONNECTIONS: PRIMITIVE, BUT POSSIBLE

• USAGE METERING: NO STANDARD IMPLEMENTATIONS

• CHARGING: NO STANDARDS

• BILLING: MANY OPTIONS
CONCLUSIONS

• ATM SVC MANAGEMENT HAS BEEN NEGLECTED

• INTRODUCTION OF SVCs POSTPONED

• IPv6 / RSVP FACE SAME MANAGEMENT PROBLEMS

• MORE RESEARCH IS NEEDED