Dynamic Modelling of A Two-Stage
ATM Tandem Banyan Switch

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ABSTRACT

This dissertation studies the dynamic modelling of Two-State ATM Tandem Banyan Switch. First of all, ATM technology and ATM switch are introduced, then the ATM switch's architecture and its functions are discussed in detail. A Two-State ATM Tandem Banyan Switch has been selected as a model to be simulated. MATLAB's Simulink tool has been used to dynamically model the ATM switch. The ATM switch simulated is a simple two-stage Banyan Switch. It consists of 2 Inports x 2 Outports, with a switching algorithm included. The algorithm covers all cell flow patterns that are possible in a 2 Inports x 2 Outports Banyan Switch. The objective is to keep the cell loss rate at a minimum level. Lastly, this project presents an example of dynamic simulation, which will examine the cell flow patterns, cell loss rate and the switch performance. Discussion and overall conclusion are made based on the simulation results.
ACKNOWLEDGEMENTS

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ACRONYMS

ATM  Asynchronous Transfer Mode
ABR  Available Bit Rate
CAC  Connection Admission Control
CBR  Constant Bit Rate
CDV  Cell Delay Variation
CLR  Cell Loss Ratio
CTD  Cell Transfer Delay
DEMUX Demultiplexer
FIFO First In First Out
GUI  Graphical User Interface
HEC  Header Error Control
IM  Input Module
ISDN Integrated Services Digital Network
ITU  International Telecommunication Union
LAN  Local Area Network
MINs Multistage Interconnection Networks
MUX  Multiplexer
NIST National Institute of Standards and Technology
NNI Network-Node Interface
NPC Network Parameter Control
OAM Operation and Maintenance
OM  Output Module
OPNET Optimised Network Engineering Tool
QoS Quality of Services
SM  Switch Management
SONET Synchronous Optical Network
STM Synchronous Transfer Mode
TBSA Tandem Banyan Switch Architecture
TDM Time Division Multiplexing
UBR Unspecified Bit Rate
<table>
<thead>
<tr>
<th>Acronyms</th>
<th>Description</th>
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<tbody>
<tr>
<td>UNI</td>
<td>Unified Network Interface</td>
</tr>
<tr>
<td>UPC</td>
<td>Usage Parameter Control</td>
</tr>
<tr>
<td>VC</td>
<td>Virtual Connection</td>
</tr>
<tr>
<td>VCC</td>
<td>Virtual Channel Connection</td>
</tr>
<tr>
<td>VCI</td>
<td>Virtual Channel Identifier</td>
</tr>
<tr>
<td>VoIP</td>
<td>Voice over Internet Protocol</td>
</tr>
<tr>
<td>VPI</td>
<td>Virtual Path Identifier</td>
</tr>
<tr>
<td>WWW</td>
<td>World Wide Web</td>
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