WUGS-20 Graphical Monitor

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Introduction

• Course project of CS577

• Software project: Visualize information for WUGS-20 Gigabit switching system
  • Software Architecture
  • Design Issues
  • Implementation
  • Future Extension
  • Demo slides
Software Architecture

Distributed structure

Prober → ATM socket → Switch Controller → Switch

retriever

memory

controller

TCP socket

GUI

parser

User side

Switch side

Design Issues

• ATM Socket (16 bytes data)
• User Interactive Response Time
• Data Structures
  • Keep the whole VXT and maintenance registers for each port in local memory
  • For multicast calculation, need additional VXI
• Multipoint connection calculation algorithm
  • Get information RC, CYC_{1,2}, EADR, VXI_{1,2} from memory
  • Using a recursive function
Multicast connection calculation

- Routing Control (000 010 001 011 111)
- External Routing Address
- Recycling flags
- Virtual Path / Circuit Identifier
- Input (a item of in_port)
- Output (array of (out_port, vxi) tuples)

Implementation

- GUI Implementation (Java / Swing)
- Retriever (thread, TCP socket)
- Parser (passive module, initiated by user interaction)
- Prober (ATM socket, TCP socket)
User Interaction
- Mouse actions (currently only supported mode)
- Clickable area: port, table entries

Information on GUI
- Virtual Path / Circuit Table
- Maintenance Registers
- Link / Port Status
- Statistical Information
Retriever Implementation

- Using Java Thread, works asynchronously with GUI
- Retrieved data stored in memory, share data
- 2 threads, with different interval time between two retrieve operations
- Communicate with remote prober using TCP socket

Parser Implementation

- Working in passive mode, works like a filter
- Transfer byte array data stored in memory to text information which will be presented in GUI
Prober Implementation

- Working in daemon mode, always listen to TCP socket connections on designated TCP port
- Can accept several connections simultaneously, but can only execute one probe a time, because of the restrictions in ATM socket
- Acceptable commands
  - REG PORT FIELDNUM
  - TBL PORT
    - Return table entries whose Busy/Idle bit = 1 every entry 18 bytes (16 + VXI)
    - First VPT, then VCT, ends with VPTEND / VCTEND

Extension and Enhancement

- User modifiable graphical component (Table, writable maintenance register fields) ➞ Graphical controller
- Better representation of link load information for each port