The rise and fall of ATM

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Contents

- Explain the title
- History
- Why ATM
- Progress (or not)
- Technology scenarios
- End user motivation
- Cost model
History

- 1994 SURFnet and PTT choose ATM
  - Data, voice and video mixed on backbone
  - Call for proposals on Applications
- 1995 Utrecht - Amsterdam tests
- 1996 All universities and research labs
- 1997 TF-TEN European pilot network
- 1998 Abandon ship, what has happened?
The train model

- ATM looks so simple (movie $45/13 \approx 3$ min)
Switches got complex

- Switched Virtual Connections
- Call Admission Control
- VBR, ABR
- Shaping
- Policing
- Flow Control
- Leaky Bucket
- Leaky as the pest
The swamp

- AAL, ABR, ATM, AvCR, CAC, CBR, CDV, CLP, CLP, CLR0, CRM, CTD, DSP, DTL, E, GCAC, IAS, ICR, IISP, ICRB, ICRB, IIS, NNI, NSAP, PG, PGL, PNNI, PTSE, PTSP, PVC, PVCC, QoS, RCC, SVC, SVCC, UBR, UNI, VBR, VCC, VCI, VP, VPC, VPI, ...
The three scenarios

- **Bureaucracy**
  - Long turnaround (rtt ≈ days)
  - Expensive rented lines system

- **Complexity**
  - Automatic call setup
  - Needs probably also bureaucracy

- **Throw Bandwidth at the problem**
  - Might go wrong at bottlenecks
  - Easiest solution (UBR).
Positive remarks on ATM

- European PTT’s learned to talk ($n^2$)

- Using CBR makes it a flexible leased lines system

- Can indeed give guaranteed RTT’s and QoS
The remaining problem

- The big common sausage is not acceptable for everybody
- Need for differentiated services
- Balance resources
- Ways to go:
  - Higher layer (ATM -> IP)
  - RSVP
  - FLOW LABELS in IPv6
The management domains

- Physics-UU to IPP-FZJ => 8 kingdoms
  - Physics dept
  - ACCU
  - SURFnet
  - PTT
  - Deutsche Telecom
  - WINS/DFN
  - FZJ-ZAM
  - FZJ-IPP
End user motivation

- End users don’t want to pay
  - Decentralization places bills at end user
  - Users have a different “core business”
  - Internet is perceived as free and it works

- We must move forward

- Applications are the key
New cost model

- There is nothing like a free lunch
- Networks are expensive resources
- Borrow from supercomputer era
- New unit: megabit kilometer second (mks)
  - SURFnet has: $10 \times 155 \times 200 \times 31536000 \approx 9.8E12$ mks
  - Dynacore needs: $20 \times 400 \times 80 \times 8 \times 3600 \approx 1.8E10$ mks
  - DAS needs: $24 \times 10 \times 100 \times 50 \times 24 \times 3600 \approx 1.0E11$ mks
- Use ecash on virtual bank to account
- Use chipcards with certificates to do CAC
Discussion

- Which scenario to follow?
- Which other cost models are possible?
- If “real” money is the model, will it kill research networks?
  - I don’t contact Leiden University low temperature research group for a refrigerator

- Thanks