

Mika Ilvesmäki & Marko

Luoma:

IP switching in a simplified ATM environment



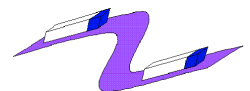
Presentation for Voice, Video & Data
Communication '97, in Dallas,
Texas

2.11.1997 Mika Ilvesmäki - Helsinki University of Technology - Laboratory of Telecommunications Technology

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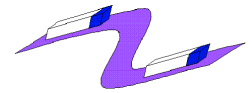
Contents



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- Complexity of 'standardized' ATM
 - Simplified ATM
 - rt-NBR and NBR
 - measurement-based CAC
 - Link management using EPD, PPD, FBA and RED
 - IP switching
 - Properties of Internet-traffic
 - Flow classification



ATM and IP



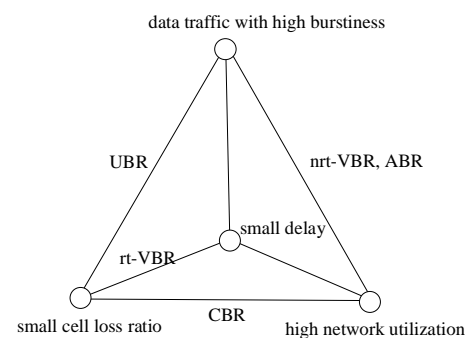
- Why ATM could be used under IP
 - ATM is fast and a reliable layer 2 technology
 - Connection-oriented and Connectionless
 - IP traffic constitutes of flows -> connections -> easy mapping of IP flows to ATM connections
 - Connections can be either topology based or traffic-driven



The present ATM

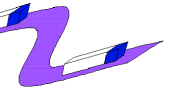


- Current ATM is too complicated and out of hands and tries to offer too many things
 - e.g. TM v4.0 and ABR
- Compromise to achieve easier and more manageable ATM





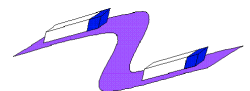
Proposed new service classes



- New traffic classes rt-NBR and NBR
- rate variations especially in NBR are buffered (or discarded) -> resembling current VBR
- Traffic contract is made based only on MCR (Minimum Cell Rate)
 - NBR=UBR when MCR is set to zero



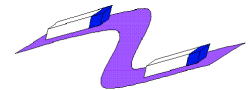
CAC



- Use measured data from the network to determine the resource allocation for rt-NBR and NBR
 - PCR or MCR -based allocation of bandwidth, buffer allocation based on delay bounds
- rt-NBR aggregates (via PCR) and NBR uses statistical multiplexing (via MCR)



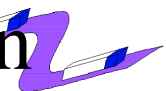
Link management



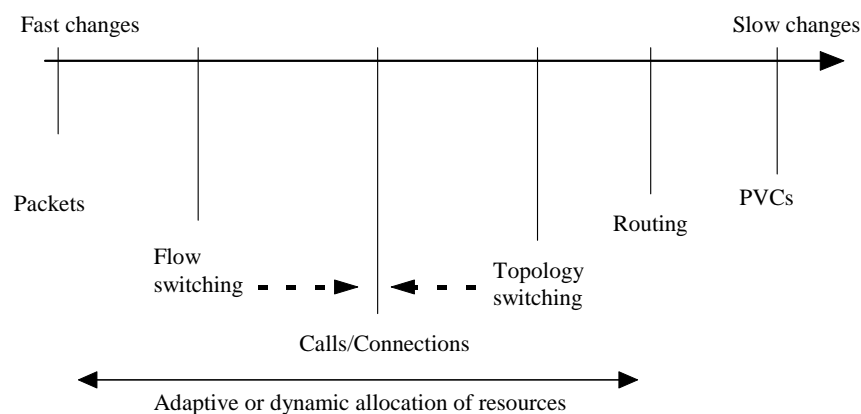
- Co-operation and co-existence of differing schemes
 - FBA, RED
 - Conventional Internet applications (NBR with MCR set to zero, i.e. UBR)
 - EPD, PPD
 - Modern Internet applications, voice and video (rt-NBR with PCR)



IP switching - short introduction

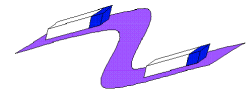


- The attack on calls





Flow analysis



- Objective: To obtain a service profile of TCP/UDP-port numbers
- Flow criteria: Address & Port-pairs with 60 second timeout
- Measured the amount of flows and packets in the network and their relation to each other

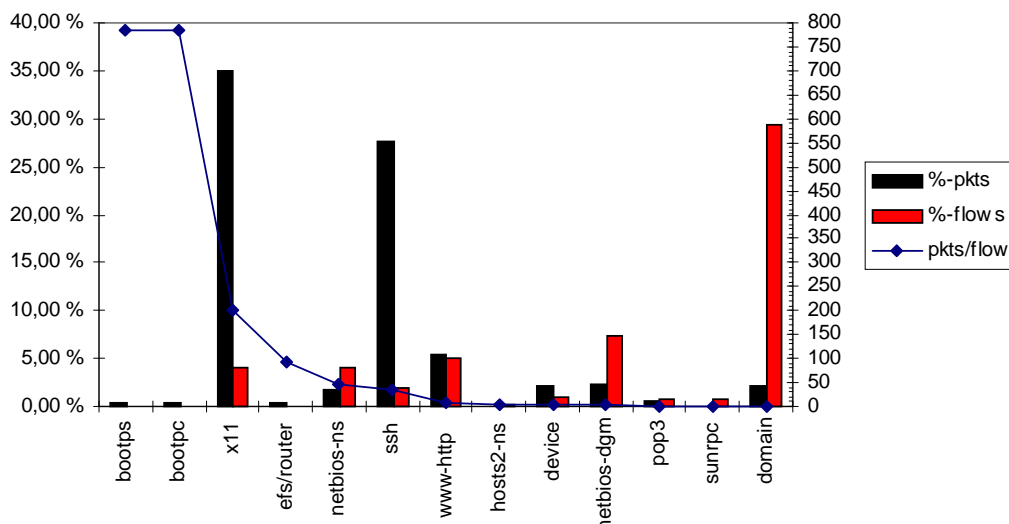


Flow/pkt profile - small network



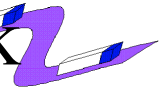
- Service profile is dynamic

Proportional packet and flow profile of services with pkts/flow



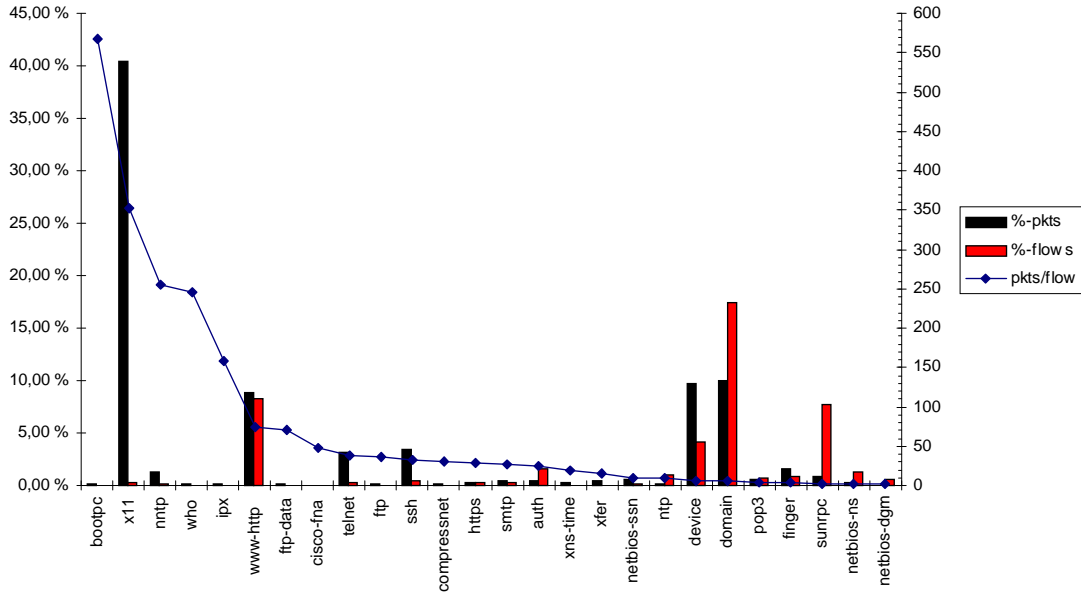


Flow/pkt profile - large network



- Depending on time, place and network size

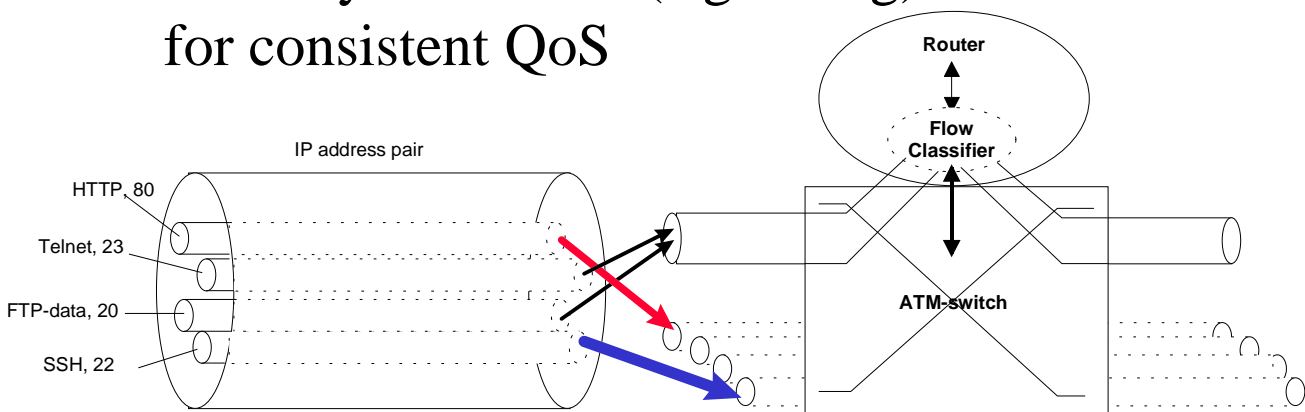
Proportional packet and flow profile of services with pkts/flow



Flow classification and mapping to ATM VC's

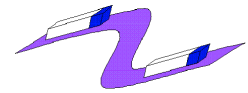


- Based on previous flow analysis
- Map router resources optimally to switched and routed traffic
- Possibly use RSVP (signalling) or ToS-field for consistent QoS





Suggestions



- Introduce simplified ATM, without the burden of complex traffic management
 - Conference 3231 Nov. 6th **Luoma & Ilvesmäki:**
Simplified management of ATM traffic
- Use IP switching, either traffic-driven or topology-aware
 - Use ATM as quick and QoS-capable layer 2 transport technology
 - Detect flows dynamically and switch them to QoS-connections



Where to from here...



- Future work
 - Evaluation of IP switching proposals
 - MPLS, Tag Switching, ARIS etc.
 - Simulations, Implementation
 - Adaptive methodology
 - Resource allocation and traffic profile detection
- <http://keskus.hut.fi/tutkimus/mitta/>
- <http://keskus.hut.fi/tutkimus/ipana/>