Simple Mobile - ATM

GMD - FOKUS

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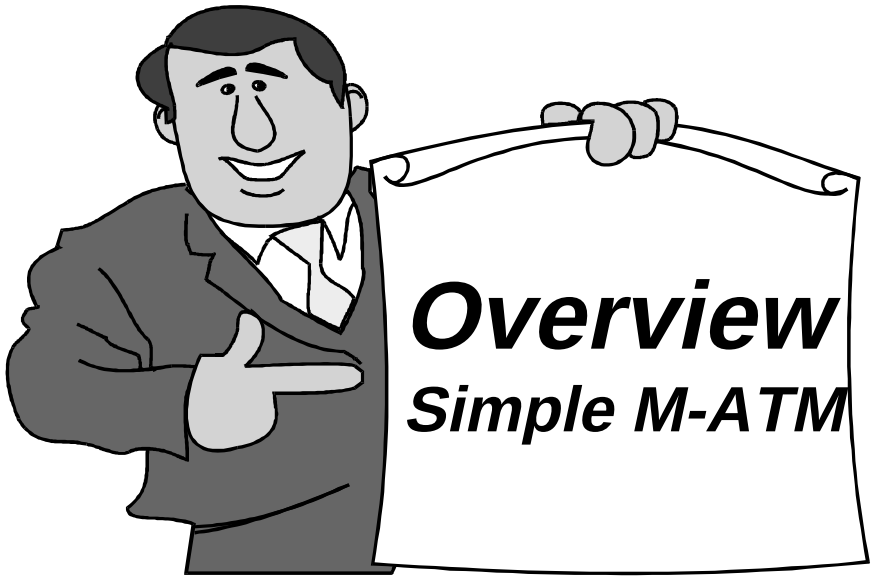

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/ INTRODUCTION

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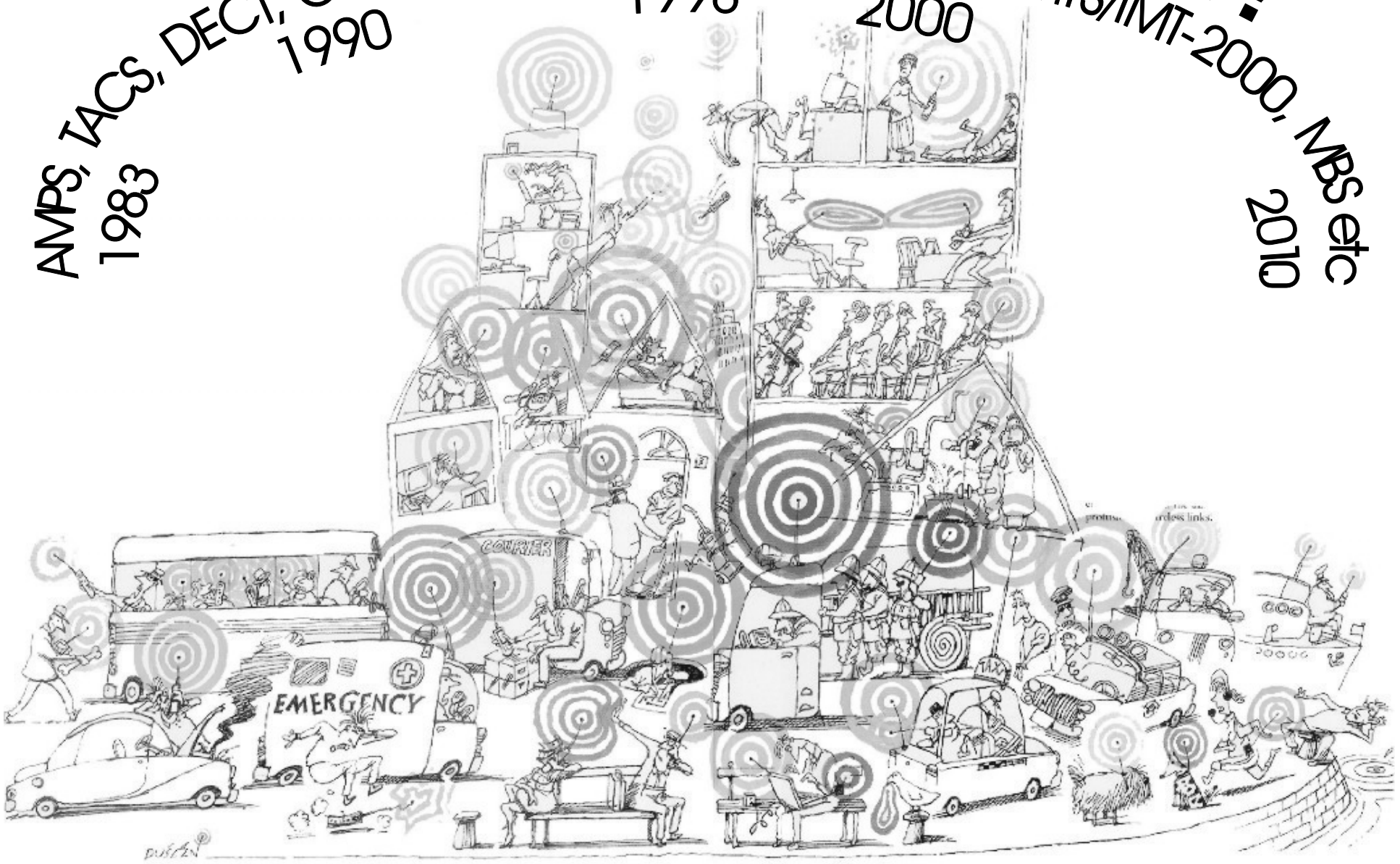
Mobility just everywhere!?

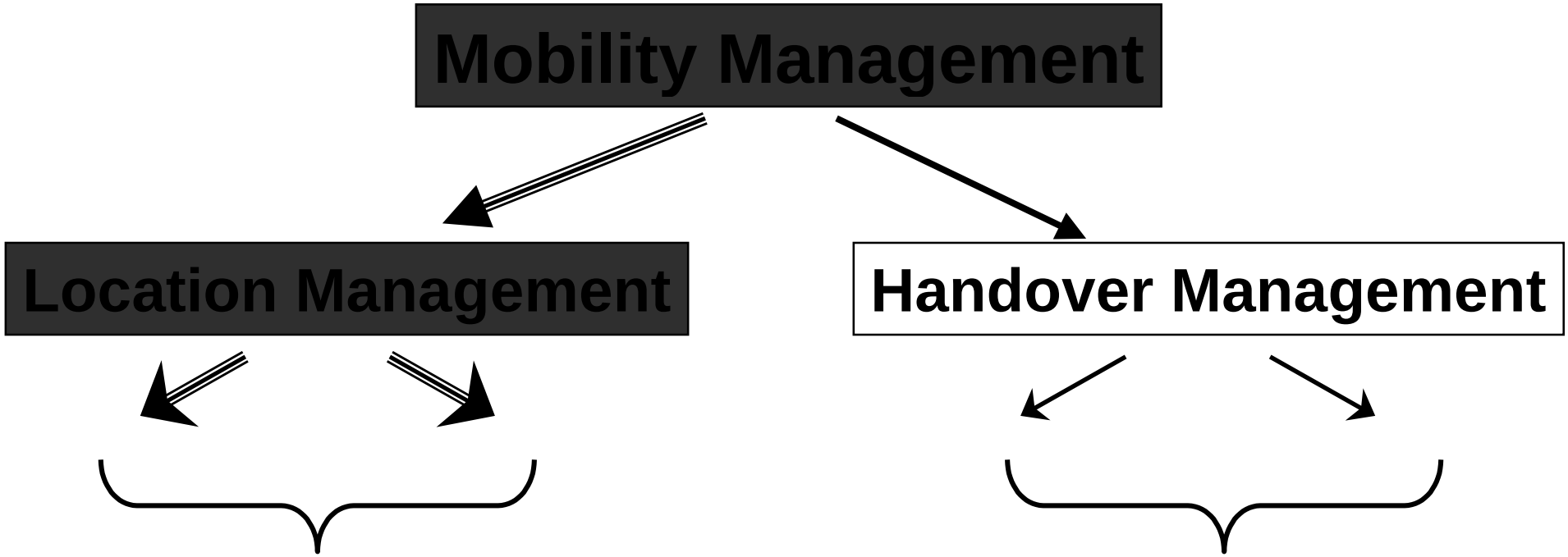
AMPS, TACS, DECT, GSM, IS-95, W-LAN, HIPERLANs, UMTS/IMT-2000, MBS etc

1983 1990 1998 2000 2010



ATM Mobility

(see e.g. ATM FORUM baseline documents)



Comment : Handover is more complex than just location management, e.g. more signaling is necessary.

We would like to have:

1) **Easy applicable to existing private ATM networks**
   - **No large additional costs for updating**

2) **The solution should be scalable**
   - **Support of large number of mobiles, large internetwork**

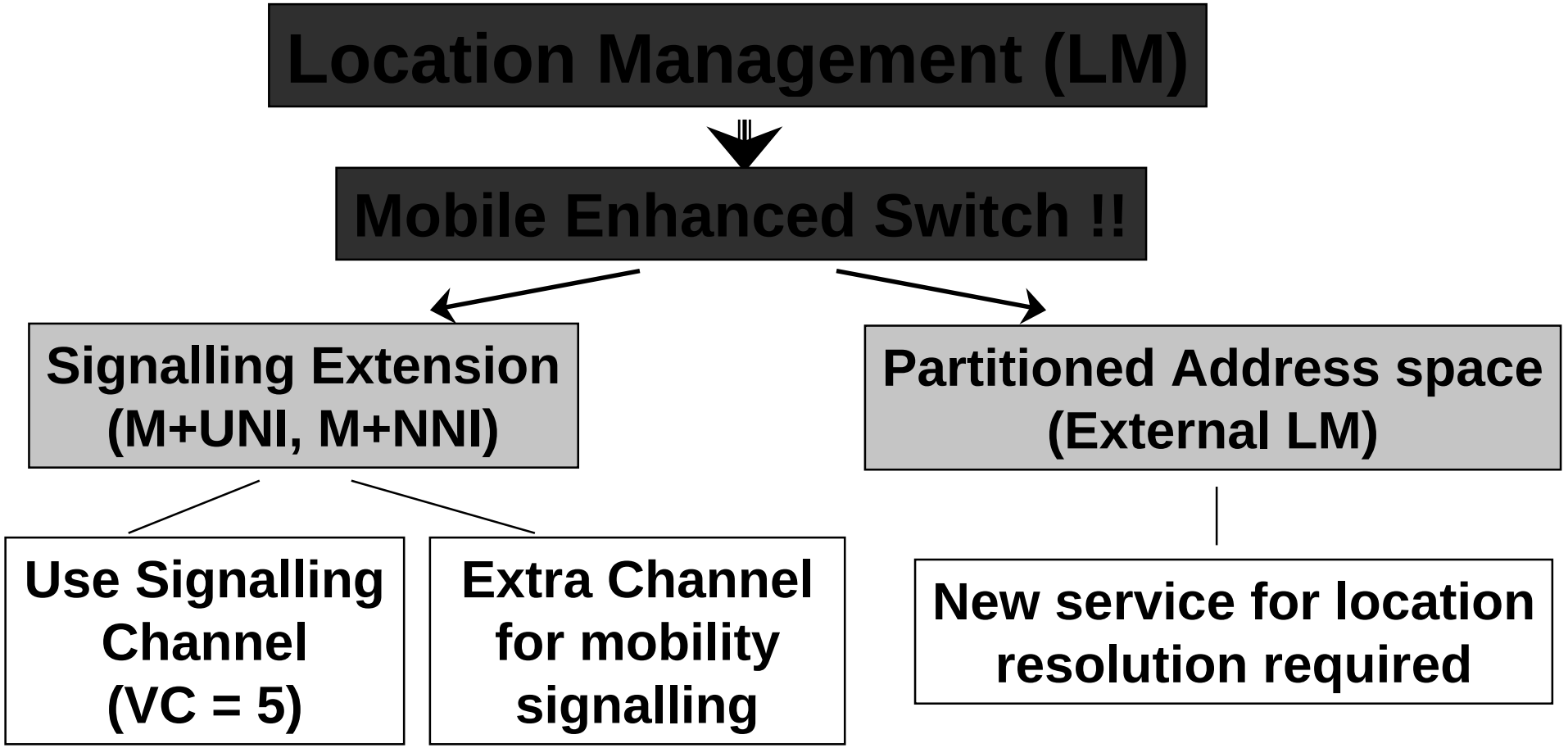
3) **Support of hosts and networks with no mobility features**
   - **Transparent working with those parts of network with no mobility support**

We would like to have:

4) **Efficient routing of virtual connections**
   - **Reasonable optimal path. Billing problem!**

5) **Minimum management overhead**
   - **Large number of mobiles should not overload the ATM network with management tasks**

There are many ways



- Additional signalling messages
- Mobile aware-enhanced ATM switch

Our Implemented Mobility

in EXISTING private ATM network by SIMPLE means
(wired / wireless access)

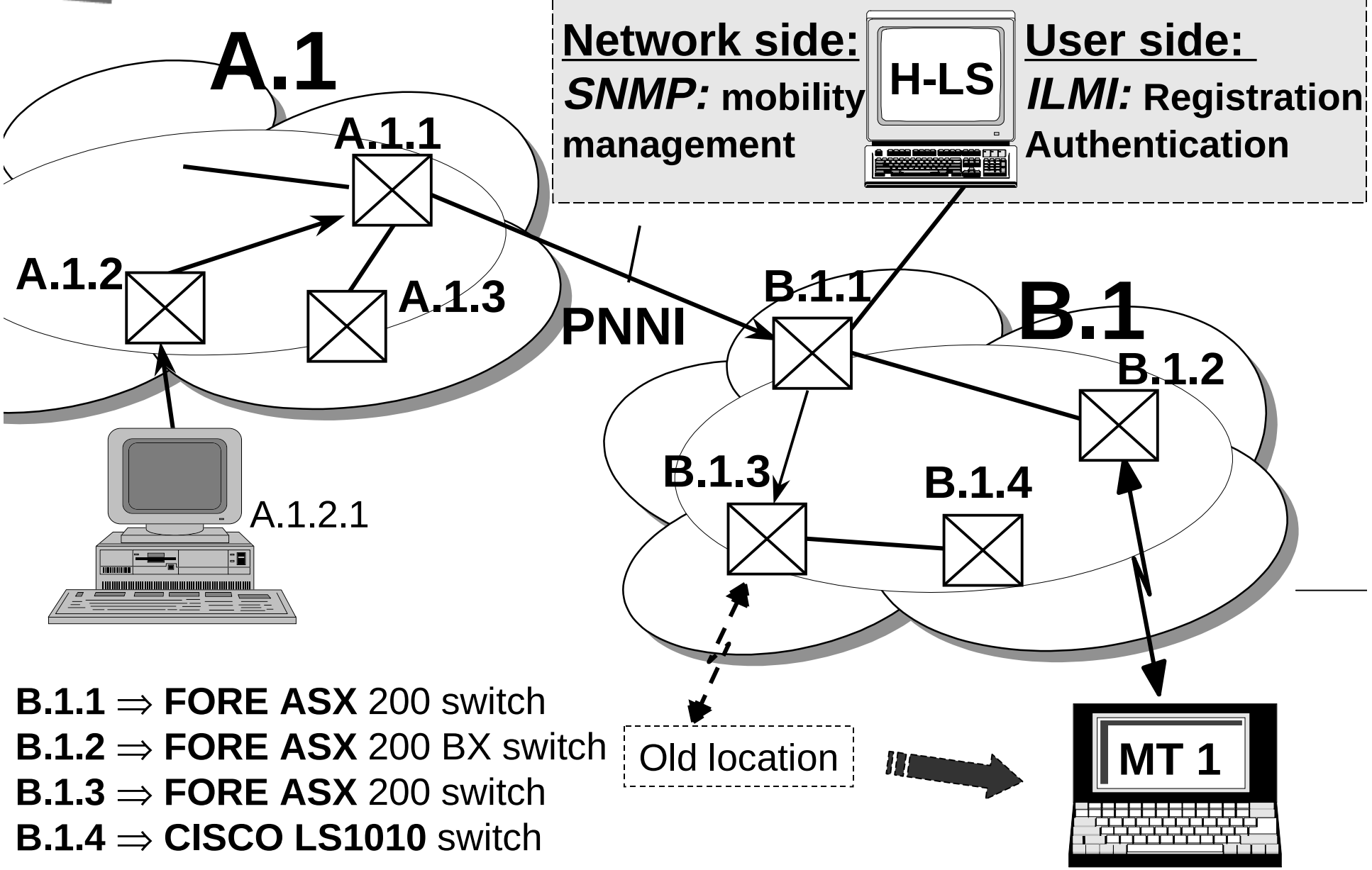
+ Allows automatically registration and location update
− Weak mobility support, working at rest

+ Uses just standardised protocols/specifications to obtain mobility: SNMP, ILMI, UNI 3.1, PNNI V1.0.
− Relatively large delay for mobile location update ~ 5 sec

+ Locally: no hierarchical number format
− Mobility support just for local terminals (LANs)

II The ATM Network at FOKUS

Scenarios

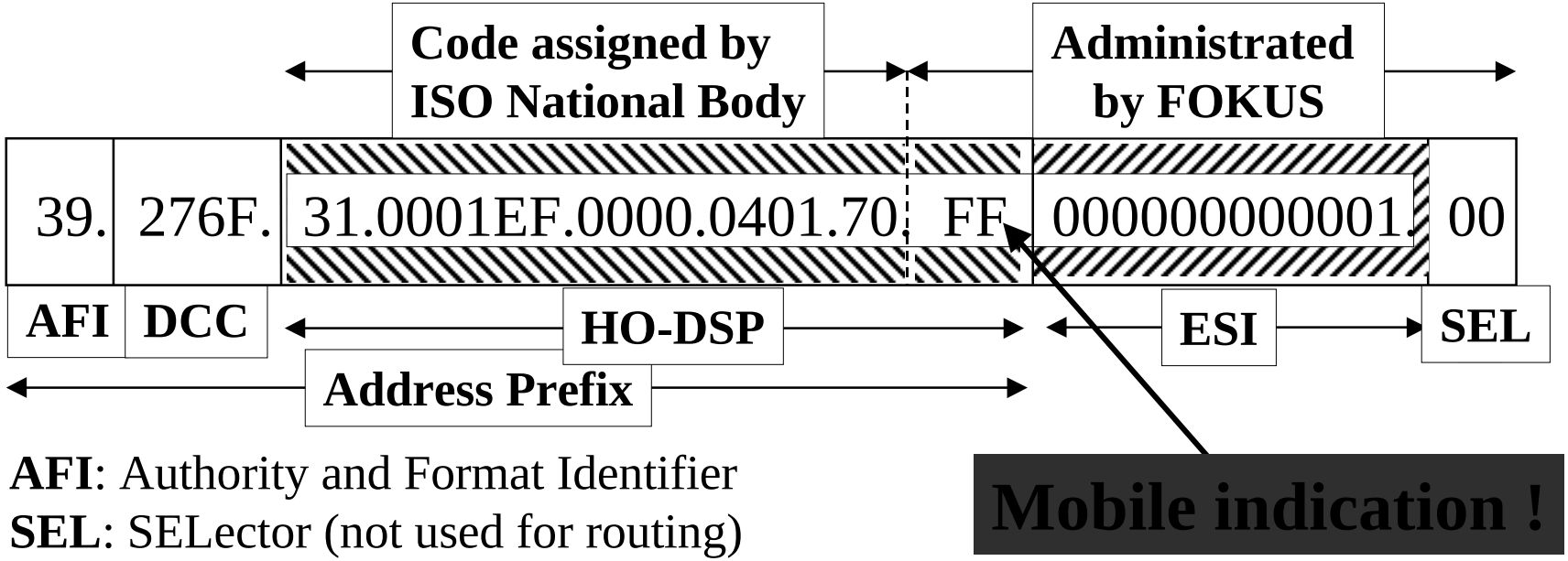


B.1.1 ⇒ **FORE ASX** 200 switch
B.1.2 ⇒ **FORE ASX** 200 BX switch
B.1.3 ⇒ **FORE ASX** 200 switch
B.1.4 ⇒ **CISCO LS1010** switch

Used Addressing Format

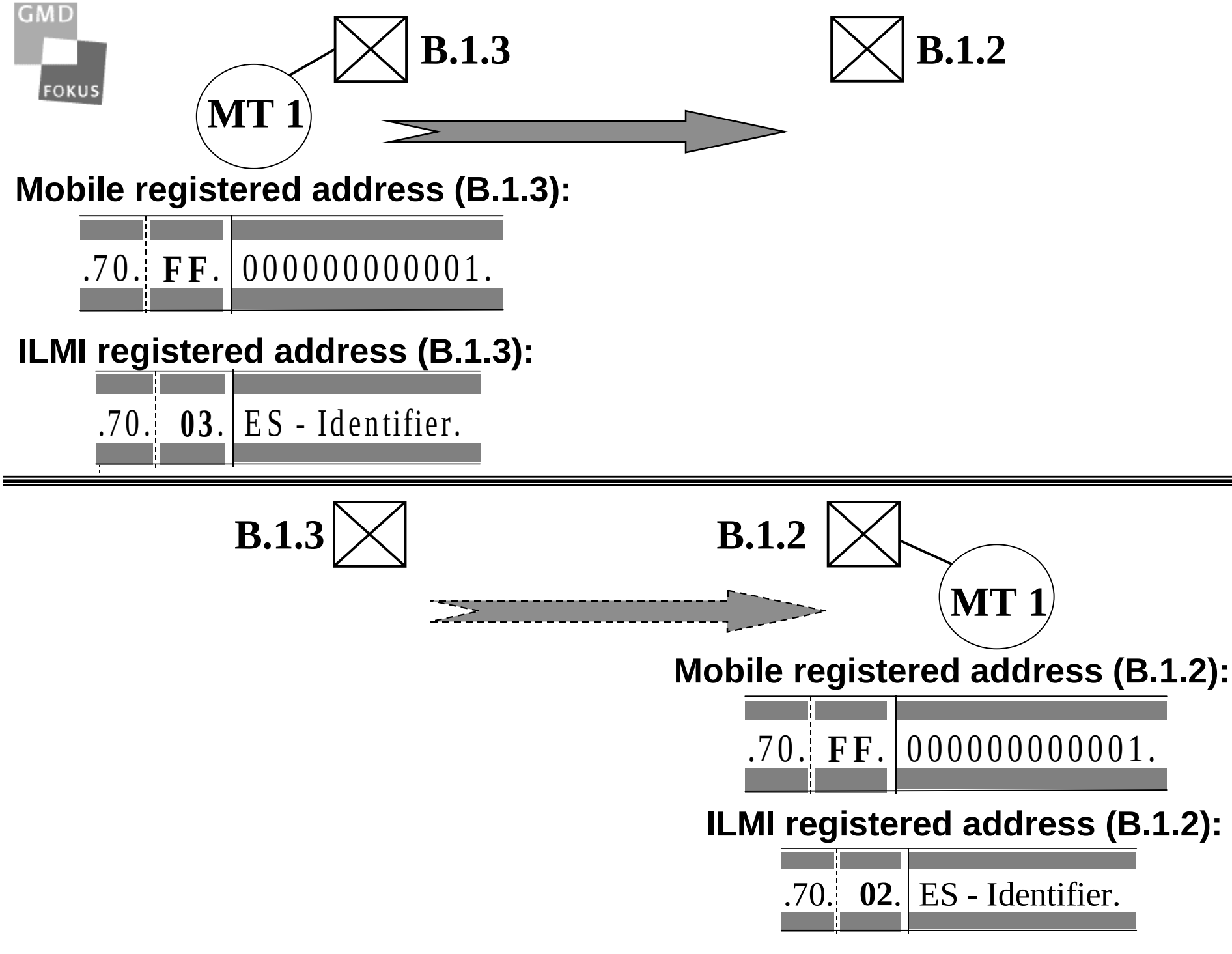
Private Networks use: 20-byte OSI-NSAP addressing format

Public Carriers use: E. 164 numbers (telephone numbers) up to 15 digits



AFI: Authority and Format Identifier
SEL: SELector (not used for routing)

- Strictly hierarchical (left-to-right) interpretation
- Allows ”variable” level of hierarchy in 13-byte prefix
- Three address formats are defined in ATM Forum
  - **Data Country Code**
  - International Code Designator
  - E.164 Private Addresses


B.1.3
B.1.2
MT 1
Mobile registered address (B.1.3):
.70.
FF.
000000000001.
ILMI registered address (B.1.3):
.70.
03.
ES - Identifier.
B.1.3
B.1.2
MT 1
Mobile registered address (B.1.2):
.70.
FF.
000000000001.
ILMI registered address (B.1.2):
.70.
02.
ES - Identifier.

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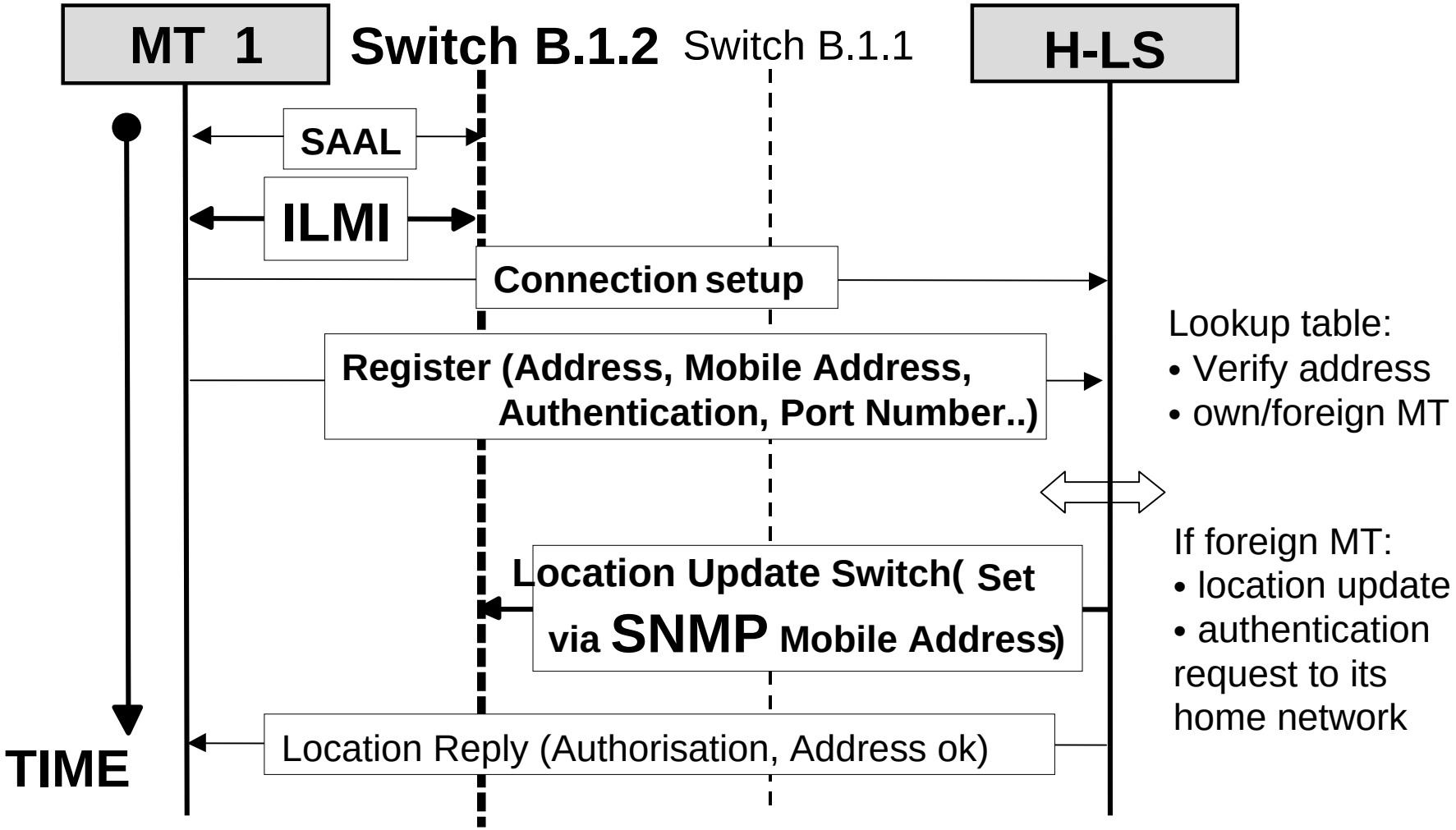
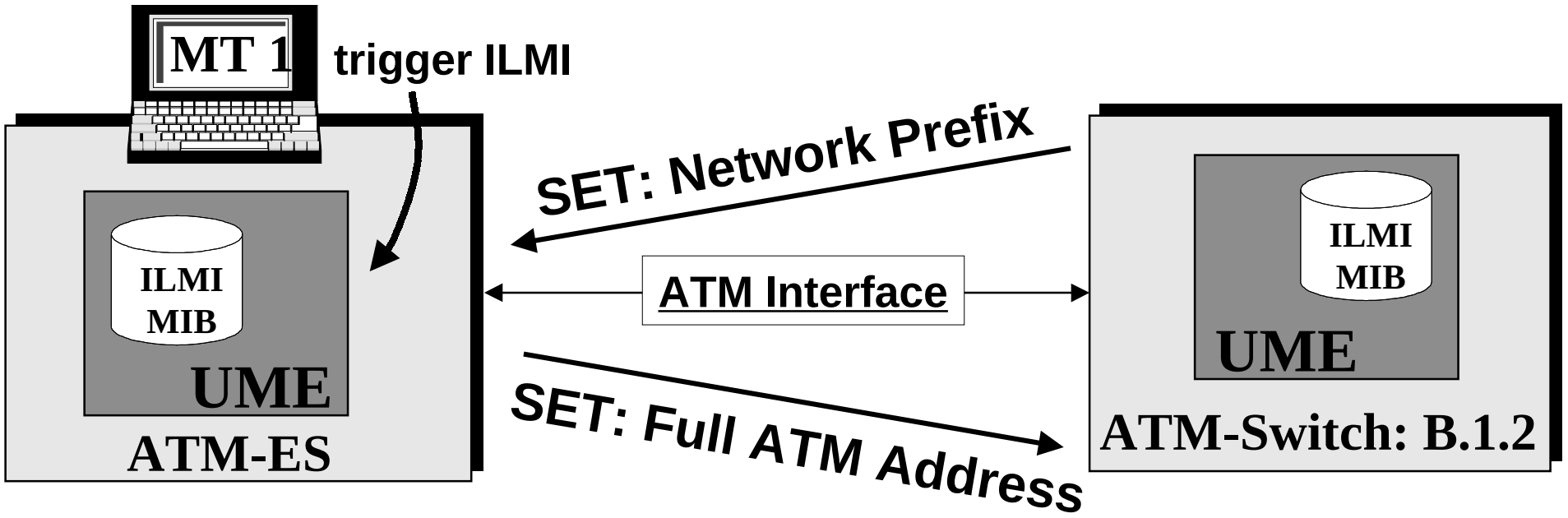
/// Mobility Management with Experimental Results

Signalling Overview



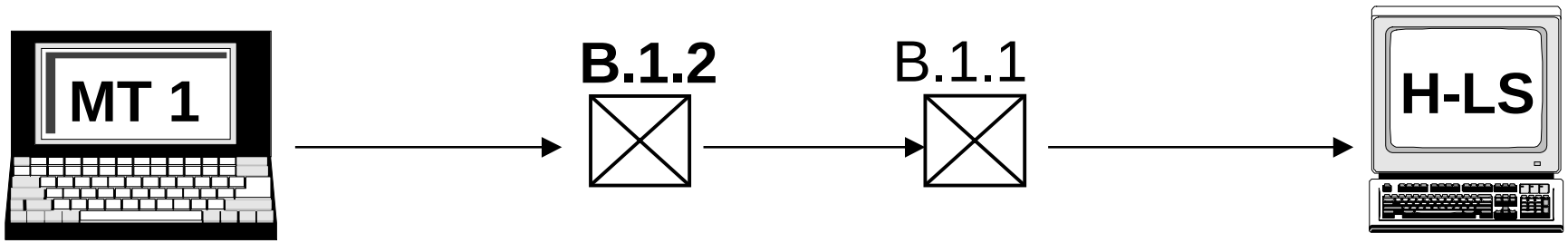
ILMI Address Registration



UME: **U**NI **M**anagement **E**ntity: The agent supports-manages ILMI MIB

- ⇨ **Prespecified virtual ATM connection (VPI/VCI 0/16) for sending AAL-5 encapsulated SNMP messages (SNMP-V1)**
- ⇨ **ILMI accesses the ATM interface MIB: get/set the information**
- ⇨ **Time < 2 second until address is set, (e.g. send Get/Set-Request)**
- ⇨ **The ILMI registered address gets cleared by link failing**

MT Registration by H-LS



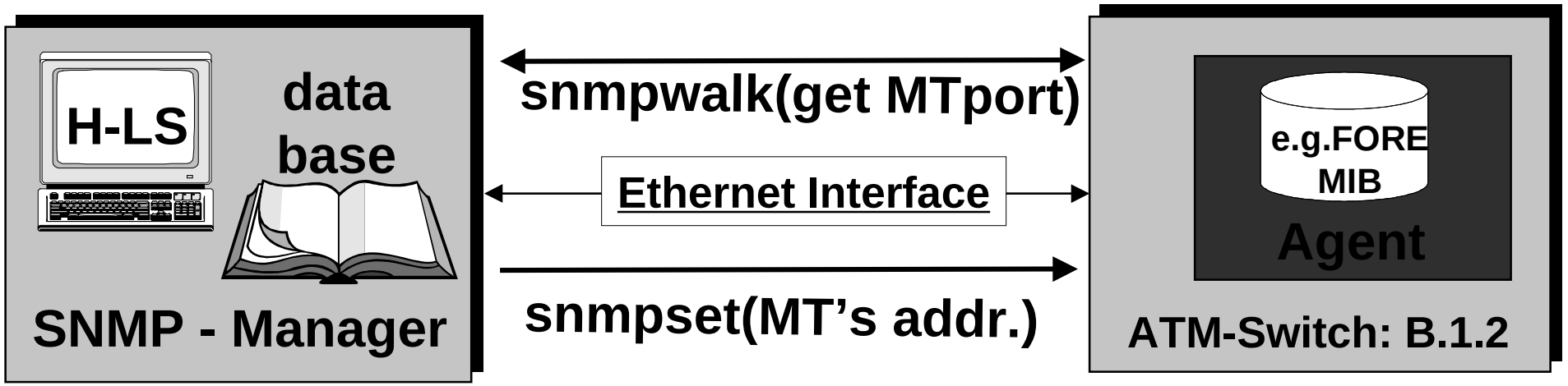
1) **Connection setup (Setup - Connect)**
   - **H-LS address is known / use ANYCAST address for H-LS (UNI 4.0)**

2) **Send: MT's ILMI and mobile address, authentication**
   - **Port number is currently obtained by the H-LS**

3) **Time ~20 msec/switch for signalling setup**
   - **(Setup & Connect)**

4) **The connection is realised if MT moves on**

HL-S: Mobile Location Update



- ⇨ **H-LS use Ethernet connection (TCP/IP) to manage switch**
- ⇨ **Defined object structure in MIBs: name, syntax and encoding (ASN.1)**
- ⇨ **We need: 1 × snmpwalk and 3 × snmpset**
- ⇨ **Average time: ~ 0.5sec/SNMP command (parsing in switch)**

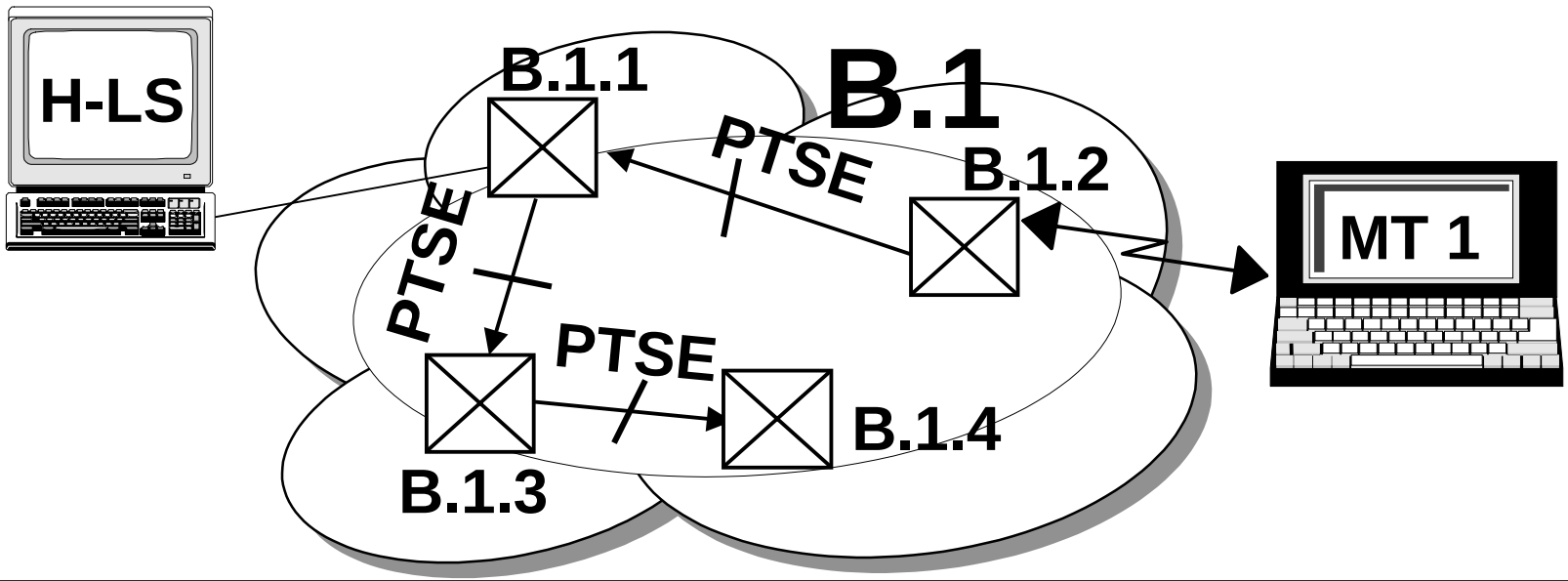
HL-S: Mobile Location Update

Tree path example for the NSAP static route address of MT:

snmpset -v 1 Hostname Community objectID type value

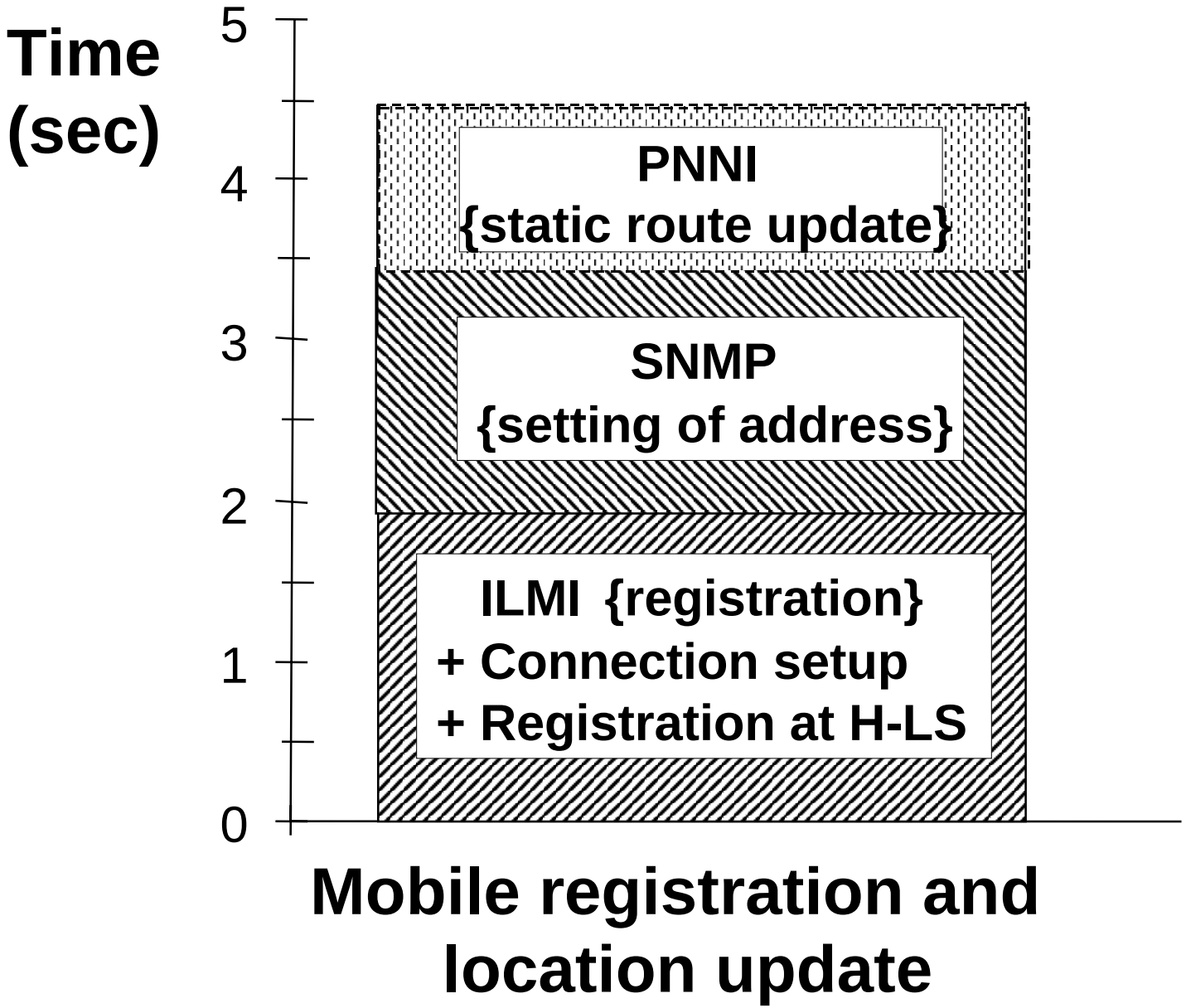
objectID = {.iso.org. .private.enterprise.fore. .nsapStaticRoute Address }

PNNI Network Update



- ⇨ **FORE Thought Private Network-to-Network Interface**
  (FT-PNNI is a pre-standard implementation of the ATMF- PNNI Phase 1)
- ⇨ **NSAP location table update within enterprise peer**
- ⇨ **PNNI Topology States Elements (PTSE) are flooded to each switch with direct connection**
- ⇨ **Time: ~< 1 sec/switch (depends on NSAP refresh time interval)**

MT Location Update Time



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Applications for Simple Mobile-ATM

- **Allowing portability in existing ATM enterprise networks**
- **Testing compatibility of simple mobile-ATM on different ATM platforms**
- **Taking SIMPLE as a interim step for current broadband ATM mobility studies**

IV Future Steps

Reduction of MT location time by:

- **triggering ILMI update direct as soon as MT gets physical connected**

Testing of new concepts:

- **address format: e.g. the use of ATM name service**
- **H-LS running Classical IP (CLIP) over ATM**

V SUMMARY

- **Mobile ATM has been introduced in existing ATM network by simple means using SNMP**
- **Routing to the MT, within the peer, will always be via the optimal path**
- **No mobile enhanced ATM switches, where UNI and/or PNNI signalling needs to be modified, are necessary**
- **We measured the speed of mobile registration time where ILMI and SNMP showed to be the bottleneck**
- **Security and billing is of no concern as our mobility is thought within local network, e.g. within a company, factory, University, etc.**

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VI DISCUSSION