Interoperable Networks for Secure Communications

A collaborative research and development project to develop and demonstrate a military internetwork that is

- Interoperable (= ability of a system (as a weapons system) to use the parts or equipment of another system)
- manageable
- secure
- mobile

across various military and civil subnetworks, based on

- existing and emerging standards, and
- commercial services and products.

http://insc.nodeca.mil.no/

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INSC(2)

INSC: 8 tasks including:

Task 1 System architecture

Task 2 Information services

Task 3 Management of large networks

Task 4 Security

Task 5 QoS routing

Task 6 Mobility

Task 7 Subnetworks

Task 8 Directory Service

NATO countries: USA, Canada, France, Germany, Italy, Holland, Norway, Great Britain

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Background/Goal

1. Infrastructure
   - high mobility or dynamics
   - examine IP-based manet routing technology
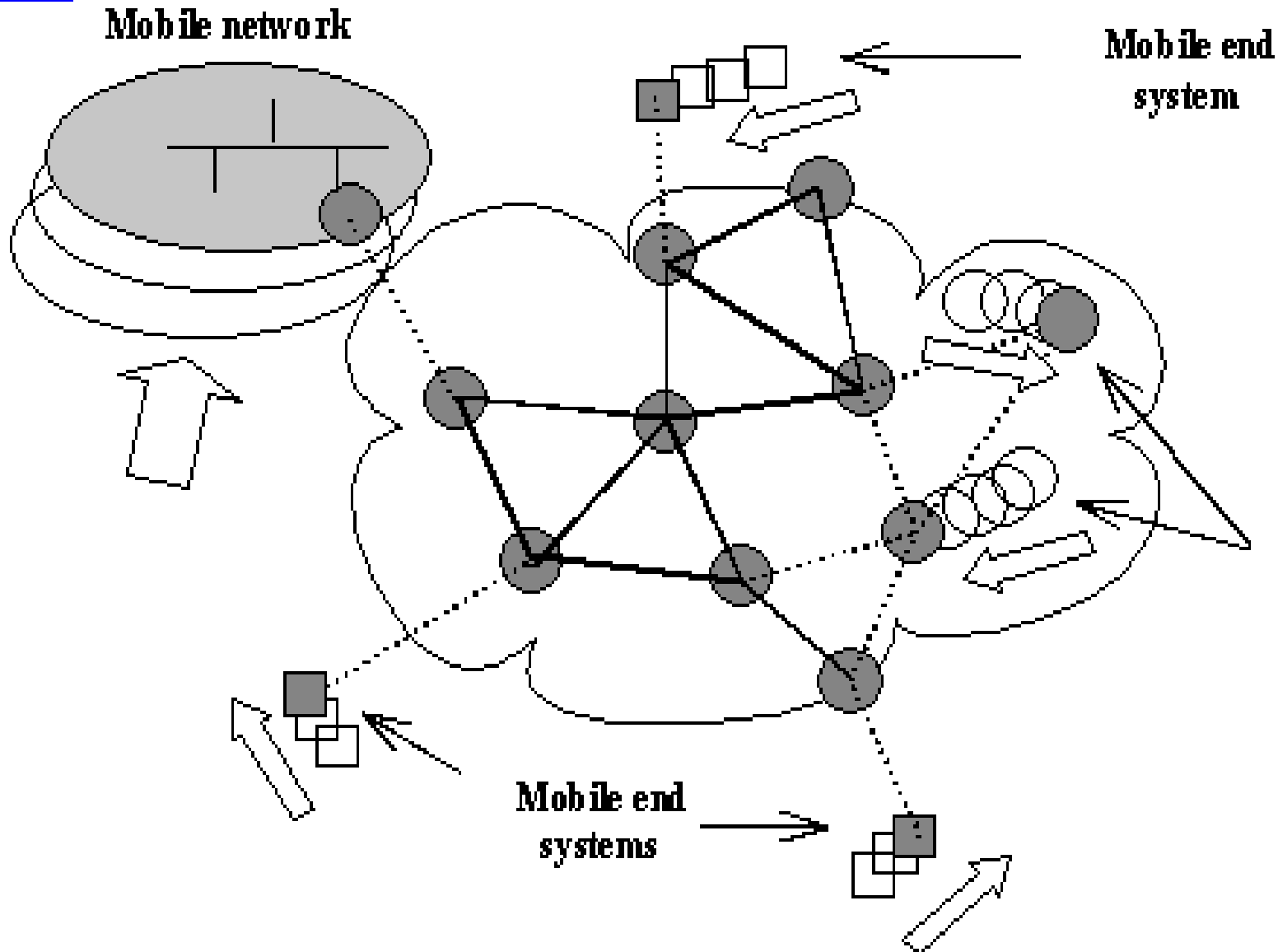   alternatives
2. Edge system mobility
   - mobile IPv6
   - nodes roaming amongs multiple network, while
   retaining their home-based identites
3. Prototype
   - demonstrate these two functions operating in a
   cooperative manner

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Background/Goal (2)

Mobile network

Mobile end system

Mobile end systems

INSC Task 6: Mobility

Phase 3 – Prototype

1. mobile IPv6 (MIPv6)

2. routing protocol (OLSR)

3. userspace tools/multimedia app. (vic/gnomemeeting, iperf, mgen, netperf)

must work! --> National presentation for the Norwegian Military sept/okt. 2003

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MobileIP

Why MIP?

- A mobile node could change it's IP each time it moves to a new link, but can then NOT maintain transport and higher-layer connections..

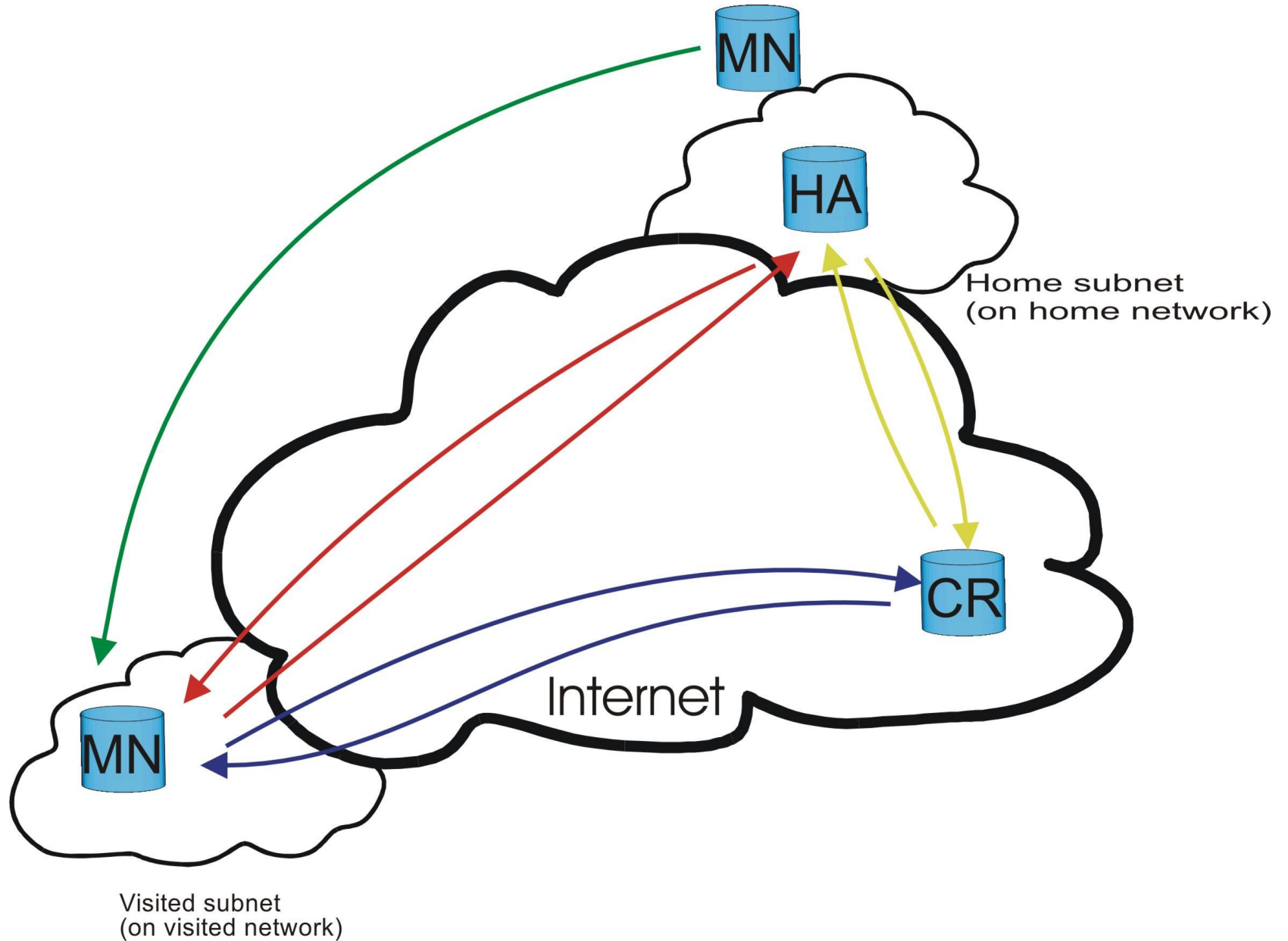- a mobile node (MN) is always addressable by it's "home address"

"mobile computers are most likely to account for the majority of the population of the Internet during the lifetime of IPv6"
        - draft-ietf-mobileip-ipv6

MobileIP (2)

MN

HA

Home subnet
(on home network)

CR

Internet

MN

Visited subnet
(on visited network)

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MobileIP (3)

Practical MIPv6?

* using MIPv6 Linux-code from University of Helsinki:
    http://www.mipl.mediapoli.com/

* Latest kernel supported is 2.4.20

* must have to different kernels:
    - one for HA support
    - one for MN support

* practically **no** how-to's or config examples
    --> lots of 'fiddling'

**current status: MIPv6 is installed successfully, but config
and testing remains.**

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Optimized Link State Routing Protocol

* OLSR is a routing protocol used in ad-hoc network

* currently two tested versions:
    1. **crcolsr** – based on olsr code from Inria (France). Now maintained by CRC in Canada
    2. **nrolsr** – maintained by US naval research

download (both): http://menetou.inria.fr/olsr/

current status: both OLSR versions are properly tested and installed successfully

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OLSR – UniK

* very promising OLSR version

* support for:
- more than one interface
- connect together different networks
- written in C (blazing fast!)
- soon support for IPv6
- optional gui frontend

* developed by: Andreas Tønnesen <andreto at unik no>

OLSRD-UniK GUI

Main | Packets | Routes | About

Registered nodes:

Dest	Gateway	Metric	Device	Power	Battery	Timer	MID	HNA
193.156.97.77	0.0.0.0	0		-	552250 ms	yes	yes
192.168.0.199	10.0.0.100	2	eth1		99	588494 ms	no	no
10.0.0.100	10.0.0.100	1	eth1		100	520535 ms	yes	no
192.168.0.99	10.0.0.100	2	eth1	-	-	563957 ms	no	yes
193.156.97.240	193.156.97.240	1	eth0		98	43178 ms	no	no

Net
Main address: 193.156.97.77
Mid adresses: 1
Hna adresses: 0
HELLO interval: 0
HELLO LAN interval: 5
TC interval: 2
Neighbor hold time: 4
Topology hold: 10

MID:
10.0.0.99
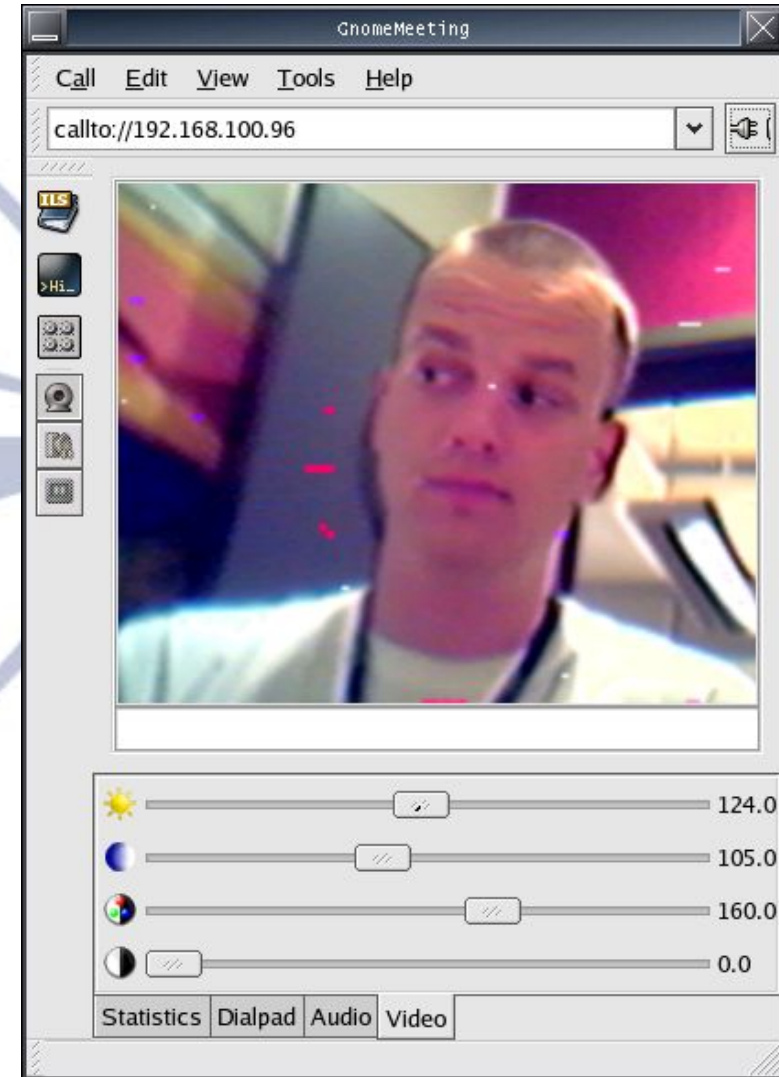
HNA:
0.0.0.0
193.156.0.0
23.4.0.0

Misc tools

* **userlevel tools**
  - gnomemeeting – experimental support for ipv6 in current libraries
  - vic - full ipv6 support, but some recompiling required

  - iperf, mgen, netperf ++ not yet tested.

* **created a install-image/script which install mipv6 kernels, olsr versions and userspace tools**

National presentation

* due in sept/okt.
* presentation for norwegian military

INSC JCWAN

CLAN - Canada

Ad hoc nettverk - Canada

LWAN - Norway

CLAN - Norway   WLAN gateway

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