

~ ISO Activities on NEMO BS ~

**CALM** -- Continuous Air Interface for Long and Medium range

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# Purpose of this presentation

- Inform the IETF NEMO WG about the use of NEMO BS in the CALM standard for Intelligent Transportation Systems defined by ISO TC204 WG16
  - ISO/TC204/WG16 accepted to use NEMO in their standard.
- Input their problem to the NEMO WG
  - MR-MNN protocol is necessary.

# ISO/TC204/WG16 and CALM

- Role of ISO/TC204/WG16 is to make the standard for ITS wide area communication.

- <http://www.tc204wg16.de/>

- CALM

- is communication architecture of ITS wide area communication.
  - must support both of ITS services (Electric Toll Collection, Fleet management, etc.) and Internet services
  - needs to support continuous communications with user transparent networking and handover spanning multiple media, media providers

## Adoption of MIP6/NEMO

- Sub-working groups are working on CALM.

- SWG16.0            Architecture
  - SWG16.1            Individual communication media for ITS
  - SWG16.2            Network Layer

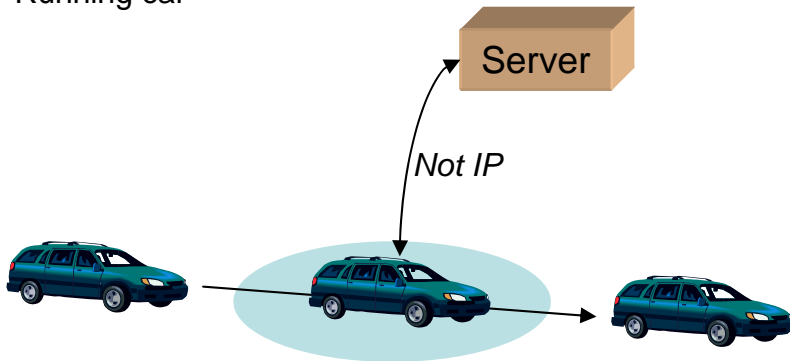
# CALM Application examples

- Low-latency applications
  - Emergency indication
  - Electric Toll Collection
  - Electric Fee Payment
  - Traffic information shower under a gate
- ITS applications
  - Traffic information distribution
  - MAP distribution / remote update
  - Fleet management
  - Probe Car system
  - Dynamic route guidance
- Internet applications
  - Music distribution, Mail, Web, VoIP...

# CALM Scenarios

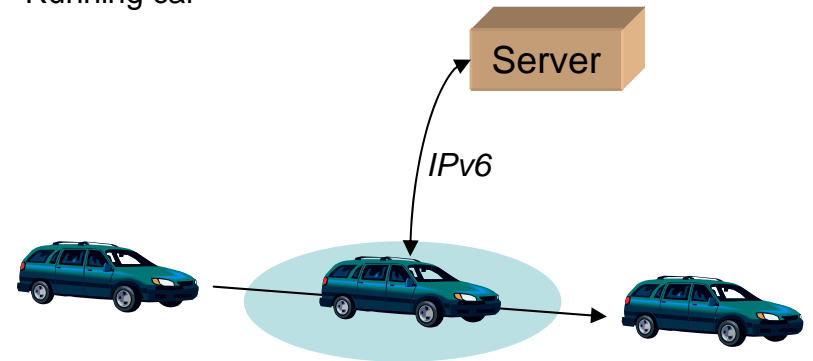
## Scenario 0 (out of focus)

- Single media
- Running car



## Scenario 1 (without the Internet access)

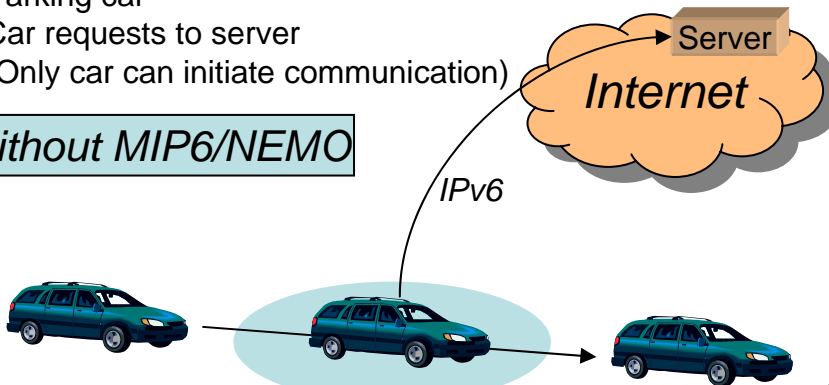
- Single media
- Running car



## Scenario 2 (without Media switching)

- Internet access using single media
- Running car with wide area communication media
- Parking car
- Car requests to server  
(Only car can initiate communication)

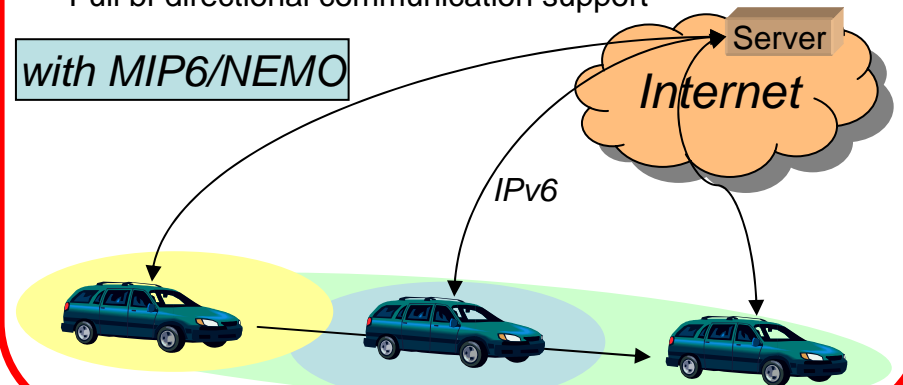
without MIP6/NEMO



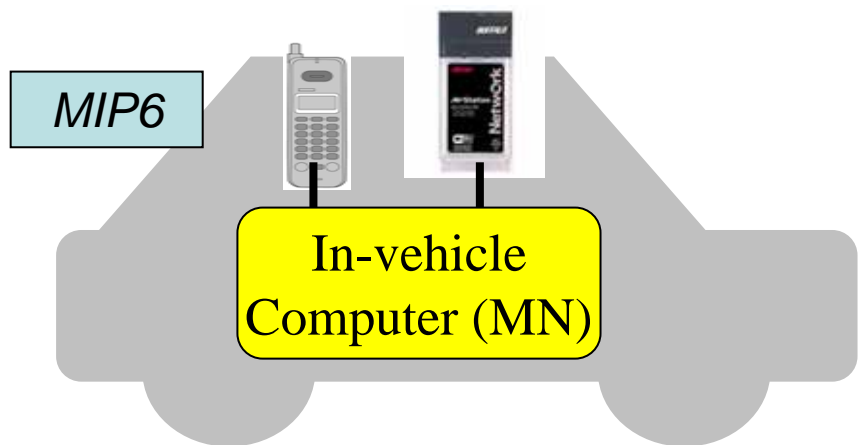
## Scenario 3 (with Media switching)

- Internet access using multiple media
- Supports both of running car and parking car
- Full bi-directional communication support

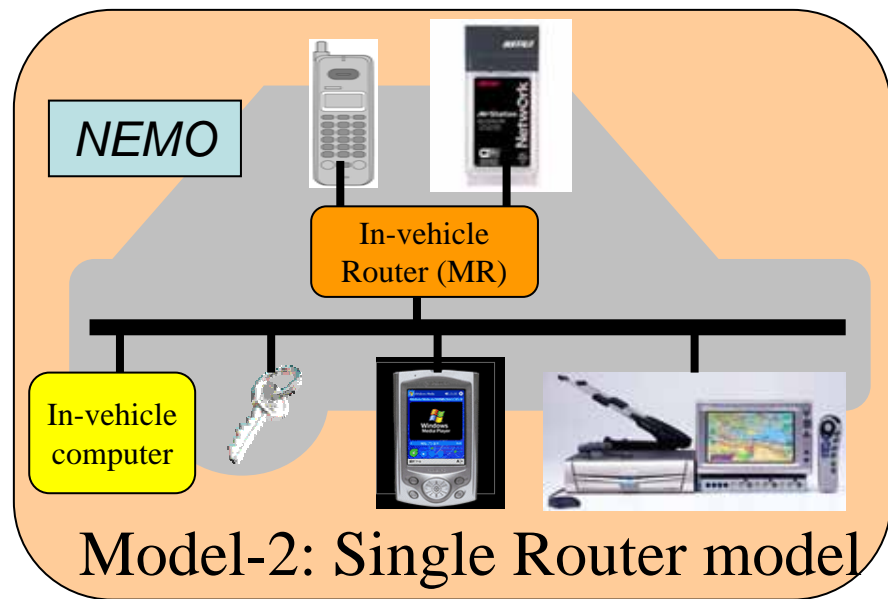
with MIP6/NEMO



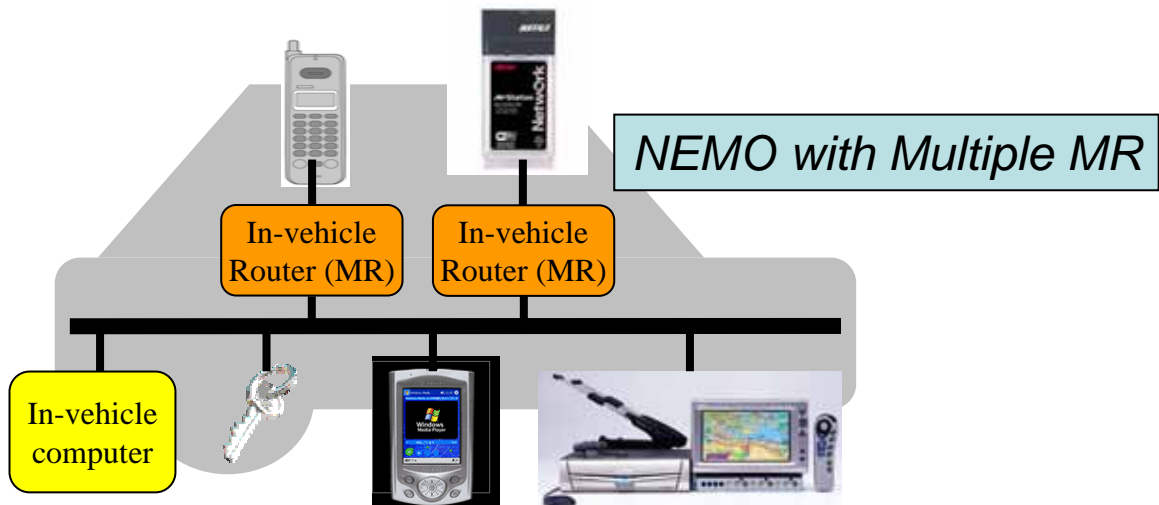
# Three Physical configuration in Scenario 3



Model-1: Single Computer model



Model-2: Single Router model



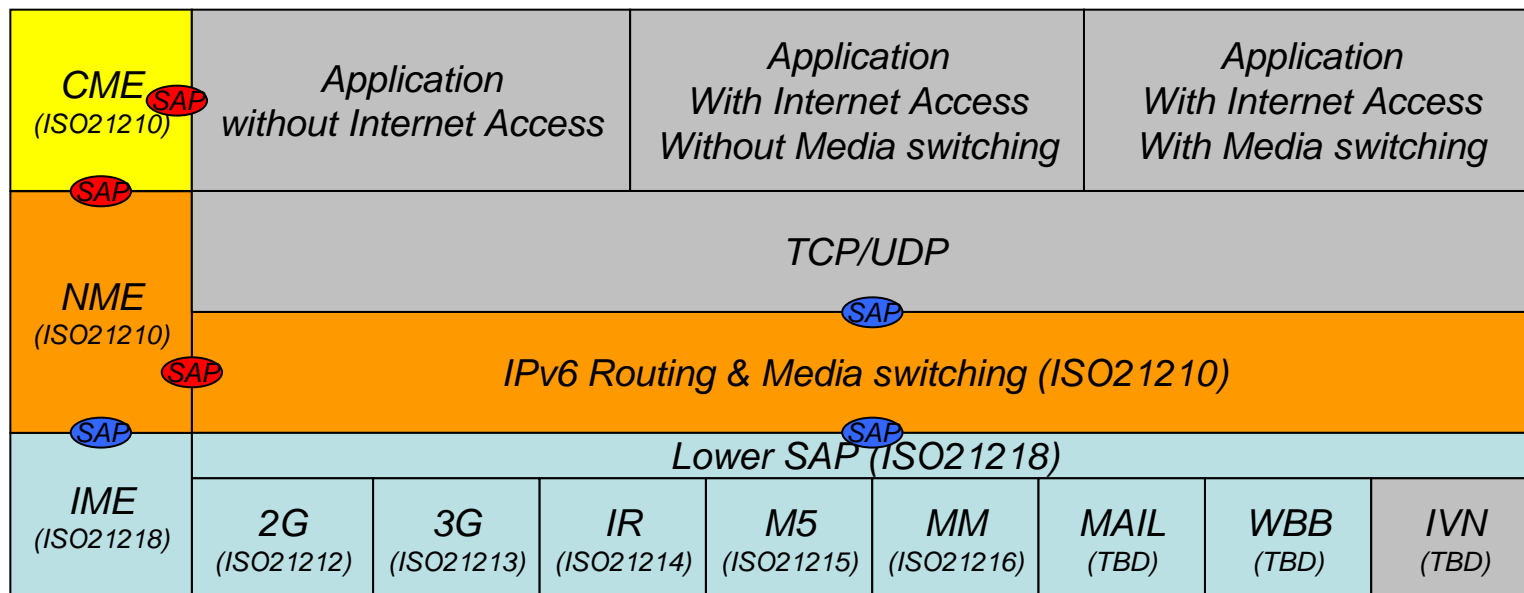
Model-3: Multiple Routers model

# CALM Architecture and SAPs of Network part

- CME: CALM Management Entity
  - Match making application policy and Network status
- NEM: Network Management Entity
  - Signal to CME the Network status
  - Control MIP6/NEMO status
- IME: Interface Management Entity
  - Signal to NME the media status
- 2G: 2<sup>nd</sup> Generation Cellular Phone
- 3G: 3<sup>rd</sup> Generation Cellular Phone
- IR: Infrared
- M5: 5GHz Band ITS Media
- MM: Microwave Media
- PPM: Point to Point Millimeter wave
- WBB: Wireless Broadband
- IVN: In-Vehicle Network

SAP SAP defined in ISO21210

SAP SAP defined outside of ISO21210



# Why do we need CME and NME?

Motivation for interface selection from the MNN

## ■ Assumptions

- MR and MNN (ex. Car Navigation System) will be delivered by different organization (company).
- Configuration will be change dynamically.
  - New communication media are available year by year.
  - User brings his/her laptop computer into a vehicle.
- Only MNN has user interfaces, runs applications.

## ■ Consideration

- “3” means that MNN must be able to do one of followings:
  - Interface switching policy setting
  - Interface selection
- “3” means that signaling protocol between MR and MNN is necessary. For examples:
  - MR->MNN: New Interface available.
  - MR->MNN: Interface has been switched.
  - MNN->MR: Which interface is most preferable.
- “2” means that MNN-MR protocol must support dynamic discovery
- “1” means that “Standard” is necessary.



# Problems

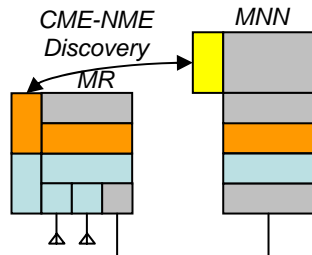
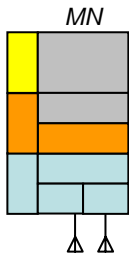
Single MR

Multiple MR

Single MNN

Model SS-1

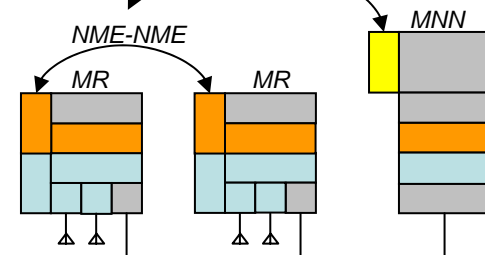
Model SS-2



Model MS

CME-NME Discovery

NME-NME

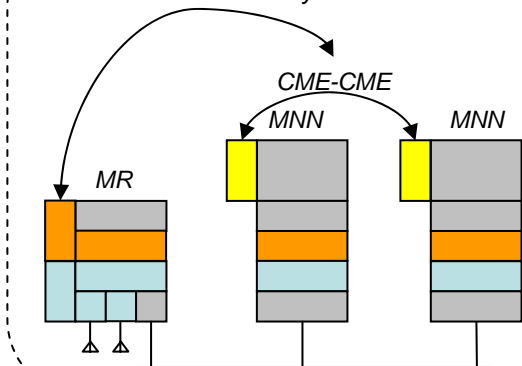


Multiple MNN

Model SM

CME-NME Discovery

CME-CME

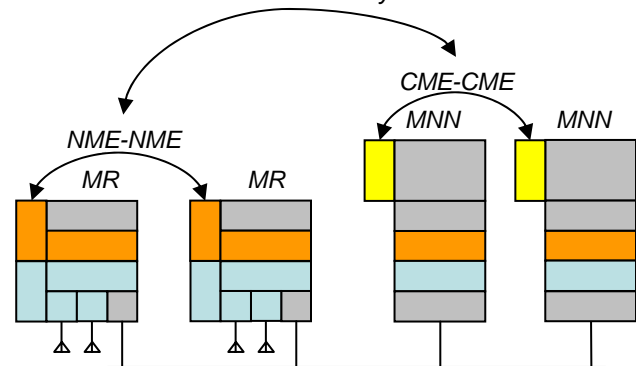


Model MM

CME-NME Discovery

NME-NME

CME-CME



# Schedule

- Apr. 2001  
Proposed PWI with other CALM Media  
Start to consider the requirements
- Apr. 2004  
NP ballot. Approved.
- Oct. 2004  
First version of Working Draft was published
- Feb. 2005  
Decided to split to two documents, 21210-1 (Internet connectivity) and 21210-2 (Vehicle to Vehicle)
- End of 2005  
CD ballot of 21210-1.

PWI = Preliminary work item

NP = New work item Proposal

CD = Committee draft

DIS = Draft International Standard

FDIS = Final Draft International Standard

IS = International Standard

*Thanks.*