

# MOBILE TRANSPORT LAYER

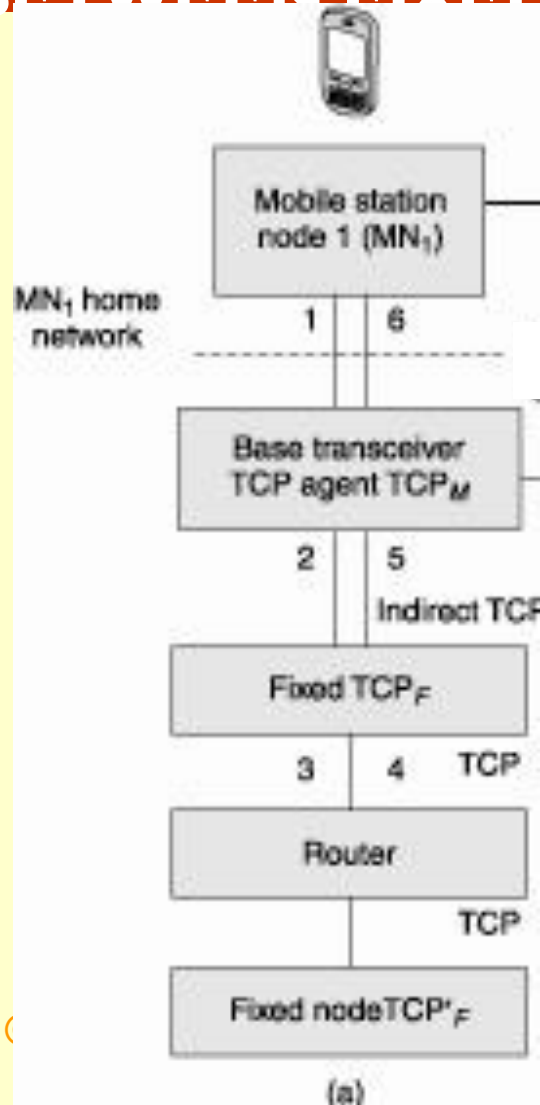
## Lesson 02

Indirect TCP, selective repeat and mobile-end transport protocols

# INDIRECT TCP—SPLITTING OF TCP LAYER INTO TWO TCP SUB-LAYERS

1. TCP<sub>M</sub> connection— between the mobile node (MN) and the base transceiver (BTS) and between the BTS and a fixed node (FN)
2. TCP connection— Fixed nodes (FN)
  - The BTS has an access point at an agent TCP<sub>M</sub> for TCP connection
  - TCP<sub>M</sub> sends and receives the packets to and from the MN through the BTS

# INDIRECT TCP SUB-LAYER BETWEEN BTS AND FIXED NODE AND CONVENTIONAL TCP BETWEEN FIXED NODES



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# INDIRECT TCP FUNCTIONS

1.  $TCP_M$  sends and receives the packets to and from the  $TCP_F$  layer at the fixed node
  - The transfer mechanism simple as there only one hop
  - Retransmission delay between  $TCP_M$  to  $TCP_F$  very small, unlike that between the fixed nodes

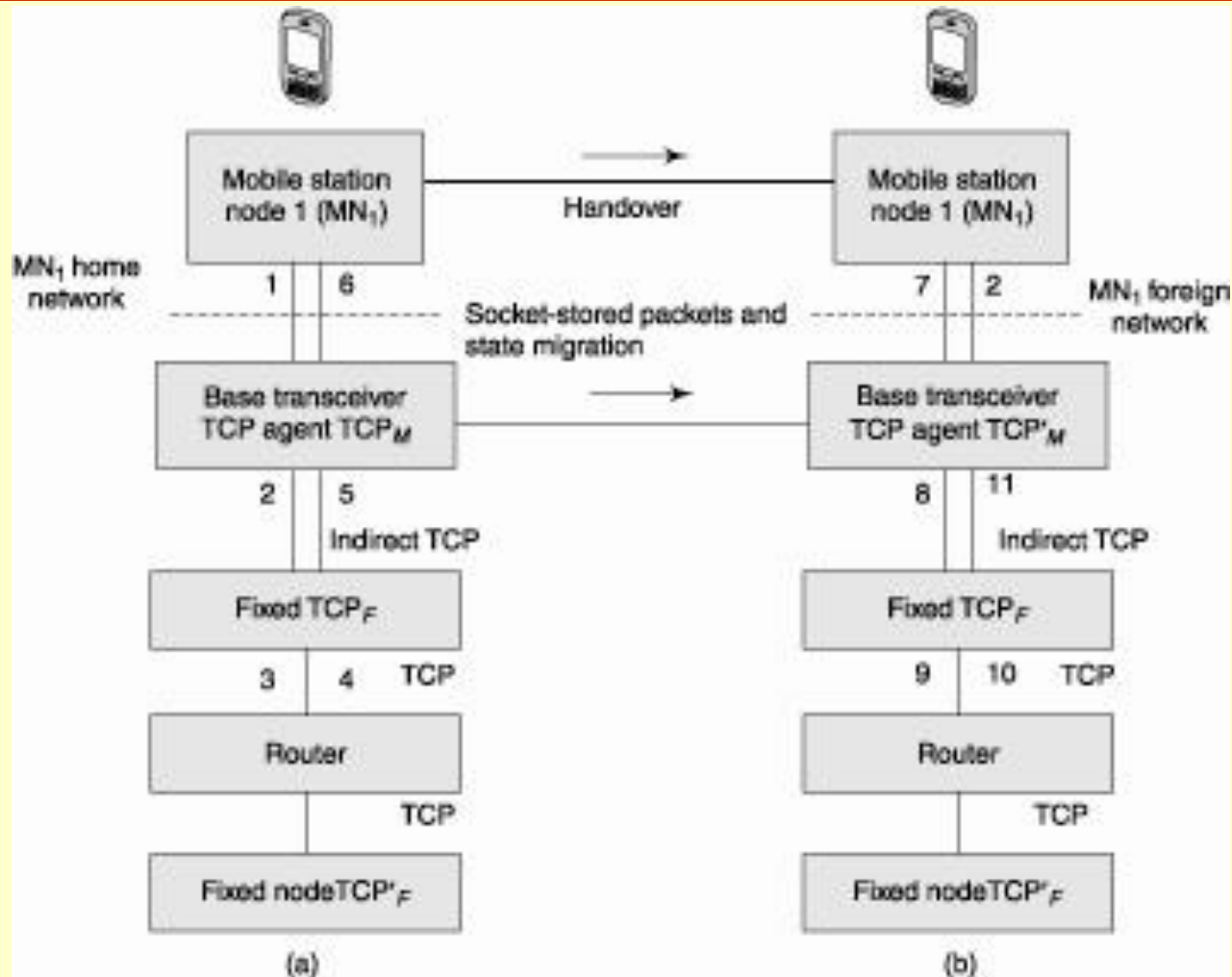
# TCP<sub>M</sub> FUNCTIONING

1. The data streams received from the service access point (application) at the MN and buffered at TCP<sub>M</sub>

# INDIRECT TCP FUNCTIONS

2.  $TCP_F$  layer at the fixed node sends and receives the packets to and from another fixed node  $TCP'_F$
- $TCP_F$  to  $TCP'_F$  transfer mechanism using multiple hops through the routers

# HANDOVER MECHANISM IN CASE OF INDIRECT TCP



# HANDOVER MECHANISM WHEN THE MN VISITS A FOREIGN NETWORK

- Packets for transmission buffered at  $TCP_M$  are transferred to  $TCP'_M$
- On handover, the socket (port and IP address) and its present state migrate from  $TCP_M$  to  $TCP'_M$
- The transfer from  $TCP_M$  to  $TCP'_M$  latency period



# ADVANTAGE OF INDIRECT TCP

- Mobile part of the network isolated from the conventional
- No change required in the existing TCP network

# DISADVANTAGES OF INDIRECT TCP

- High latency period during handover of packets
- Possible loss of data at the base
- Deviation from the end-to-end connection feature of conventional TCP, which guarantees reliable packet delivery
- Deviation— an acknowledgement to a sender may be lost during handover latency

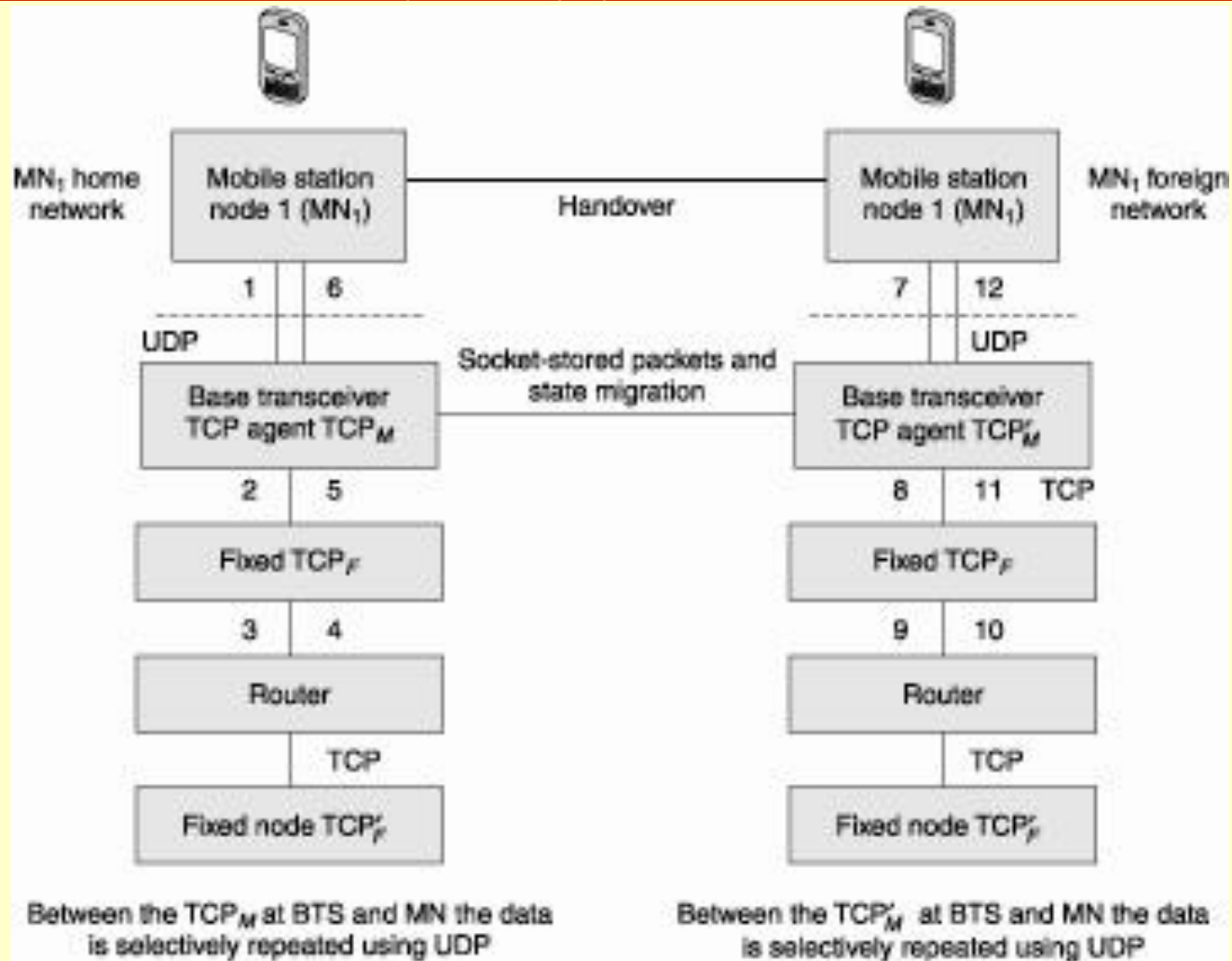
# SELECTIVE REPEAT PROTOCOL

- Modification of the indirect TCP
- Between  $TCP_M$  at the BTS and MN selective repetition of the data using UDP
- Between  $TCP_M$  at one end and  $TCP'_F$  and  $TCP'_M$  at the other end, the data stream transferred, as in case of conventional fixed-end TCP

# USE OF UDP IN SELECTIVE REPEAT PROTOCOL

- UDP— a connectionless protocol
- Selective repeat protocol does not guarantee the in-order delivery between the BTS and the MN, unlike TCP

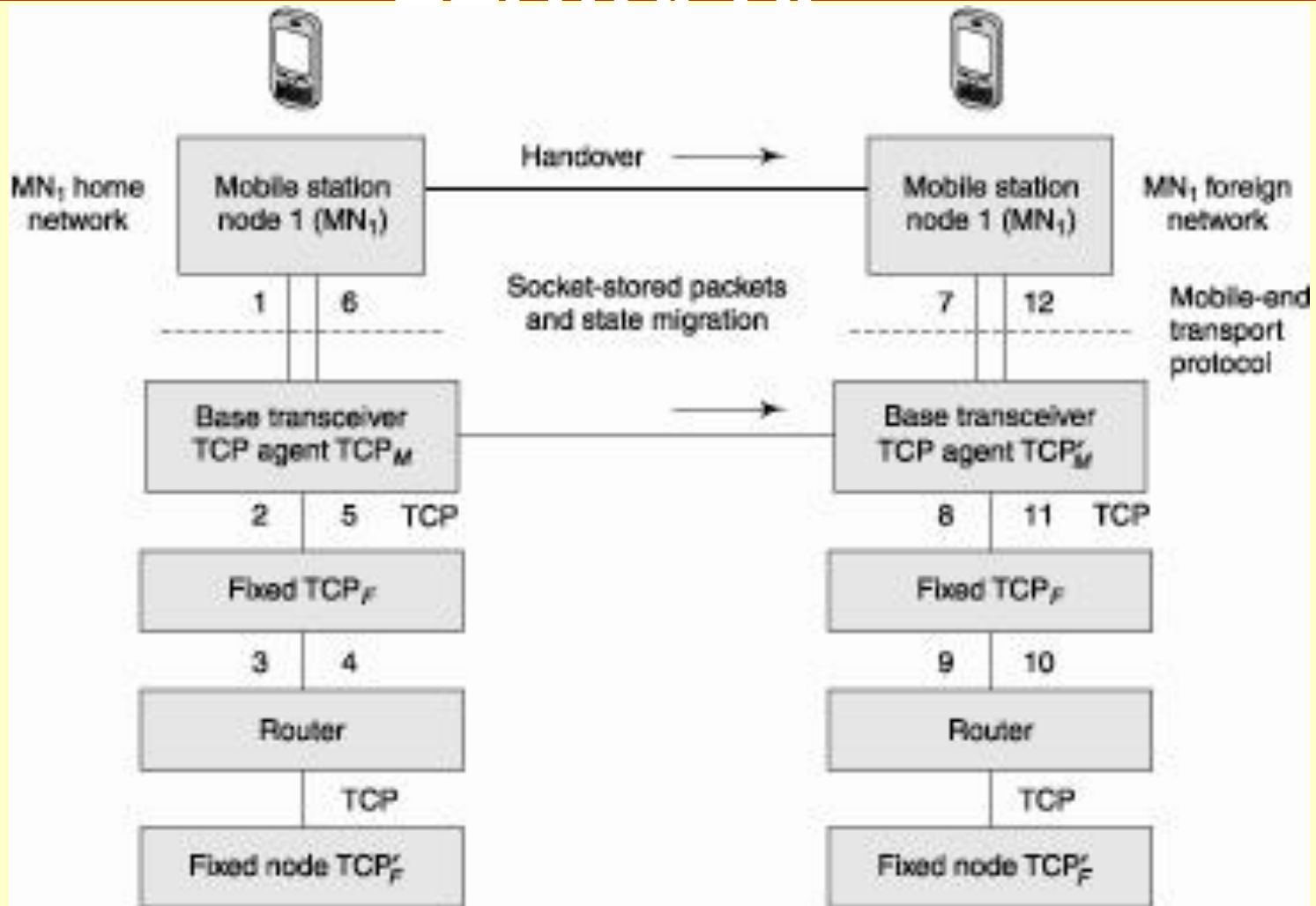
# MODIFICATION IN INDIRECT TCP IN SELECTIVE REPEAT PROTOCOL USING THE UDP BETWEEN BTS AND MN



# MOBILE-END TRANSPORT PROTOCOL— MODIFICATION OF INDIRECT TCP

- Guarantees the in-order delivery between the BTS and the MN, like TCP
- Data transferred between  $TCP_M$  at the BTS and the MN by using the mobile-end transport protocol
- Data stream transferred between  $TCP_M$  at one end and  $TCP_F$  and  $TCP_M$  at the other end, the, as in case of conventional fixed end TCP

# MODIFICATION IN INDIRECT TCP BY USING MOBILE-END TRANSPORT PROTOCOL



# SUMMARY

- Split TCP protocol
- $TCP_M$  sends and receives the packets to and from the  $TCP_F$  layer at the fixed node and between fixed points on conventional network by TCP
- Selective repeat Protocol use (i) UDP between MN and BTS, (ii)  $TCP_M$  between BTS and fixed node and (iii) TCP between fixed node ...



## ... SUMMARY

- A TCP agent in Mobile-end transport protocol in place of  $TCP_M$  or UDP between MN and BTS

## End of Lesson 02

**Indirect TCP, selective repeat and  
mobile-end transport protocols**