(WHY) Standards —> specifications   IETF, 3GPP (UMTS, LTE, WiMAX)
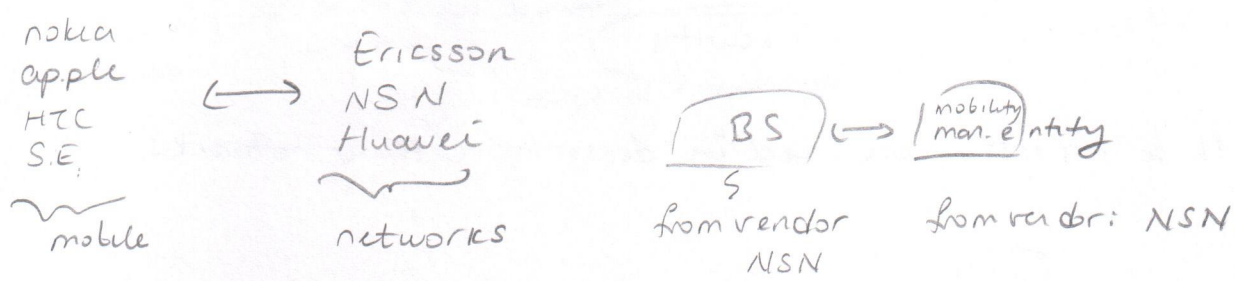
OPEN!
(mesela LTE specificationları açıktır, herkes erisebilir)

CLOSED: have to be member of organization to download specs. mesela IEEE
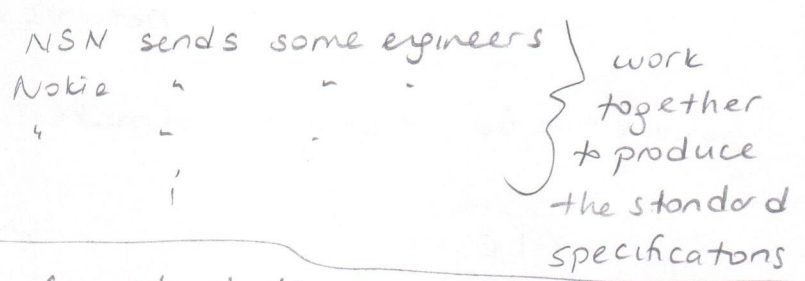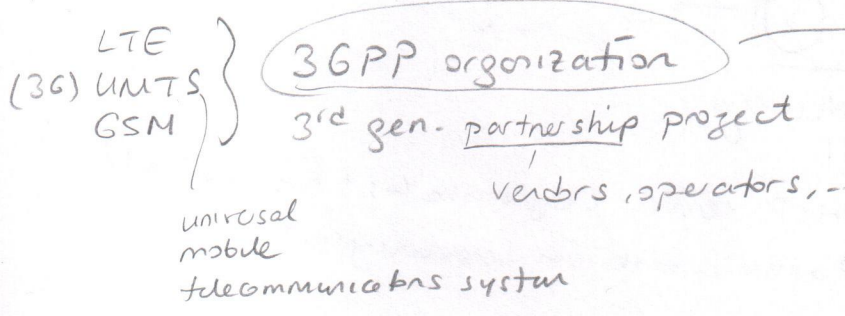
—> compatibility interoperability among equipment.

nokia
apple
HTC   <—>   Ericsson
S.E,   NSN
                 Huawei

mobile   networks

[BS] <—> | mobility man. entity |
   ↓
from vendor   from vendor: NSN
NSN

—> multiple vendors for equipments   Cost ↓

—> sharing systems engineering   NSN sends some engineers
                                  Nokia   "   "   "
                                    "   "   "   "
                                            ;
                                  } work together to produce the standard specifications

(HOW) standards : Organization specifies standards

LTE }
(3G) UMTS } (3GPP organization) —— (türkiye'den kimse yok, Turkcell bile)
GSM }   3rd gen. partnership project
                    |
            vendors, operators, —

universal
mobile
telecommunicatns system

IETF => defines internet standards (IP, TCP, mobile IP, IKE, ——
                                          (internet key exchange)

α individuals participating from mailing lists
α RFC: request for comments
IP has RFC 732, ———

(WHAT) are standards

systems engineering process!

example cellulo system

customer requirements $\longrightarrow$ cost.
high network availability
QoS for voice, video, -
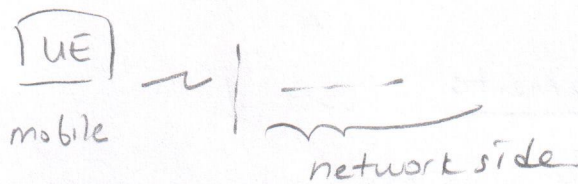long battery life
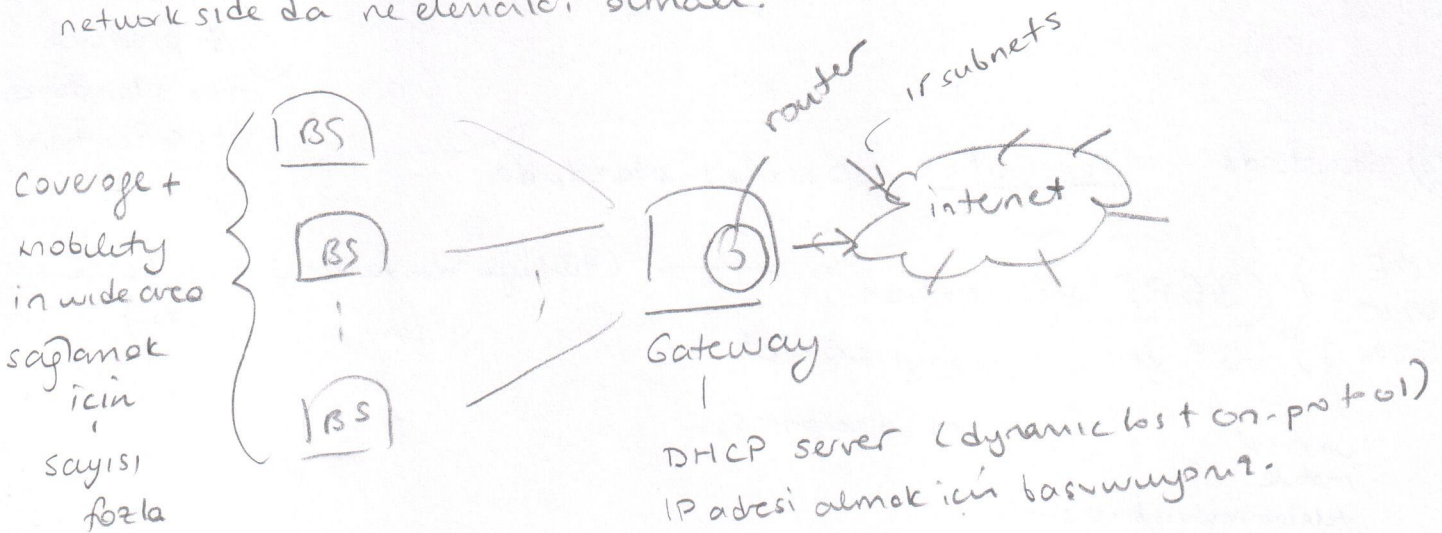mobility in wide area (service continuity)

low delay (latency), jitter

internet connectivity

security

how these requests are used in designing cellular networks

```
[UE]  ~|  ― ―  ―
mobile        network side
```

network side da ne elemanlari olmali.

coverage +
mobility
in wide area
saglamak
icin
,
sayisi
fazla

BS
BS
BS

router   ir subnets
internet

Gateway
|
DHCP server (dynamic host con-protocol)
IP adresi almak icin basvuruyoruz.

Bu elemanlar function element us , network element us organizator
by organizator degisebilir.

network elements joined by interfaces also called reference points

highest level system description: network elements + ref points -

daha detaylisi - mesage seq charts
fbw diagrams
state diagrams (daha cok protocol guceleyente bullan)

DB: subscripton DB has info about customers
serdar, voice, 1GB/month, security parameters --

in most cases, before getting IP address, connect to subs. DB!

$$ \boxed{BS} - \left(MME \right) - \boxed{DB} $$

mobility management entity