

The mobile Internet: We're no longer connected!

NOKIA

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For a mobile Internet device, what does it even mean to be connected?



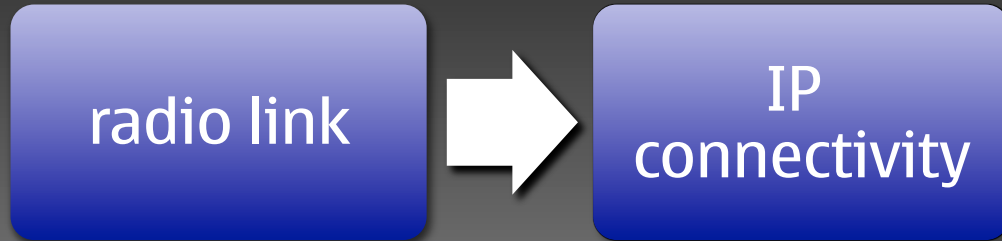
Connectivity requirements: Radio

radio link

dead obvious

no connectivity without some sort of radio link to another peer
(often, an “infrastructure” i.e. non-mobile peer)

Connectivity requirements: IP



Internet = IP connectivity

a mobile Internet device needs

an **IP address**

a next-hop **router** (itself with Internet connectivity)

access to a **DNS** server

mobility event = re-acquire all three = delay/disconnection

“IP mobility” & related “hand-over” optimizations

IP Mobility is not the complete solution.

Because you need more than IP connectivity to do useful things on the Internet.

The Internet stack is called TCP/IP for a reason...

Connectivity requirements: Path stability



the **entire** Internet runs on top of TCP

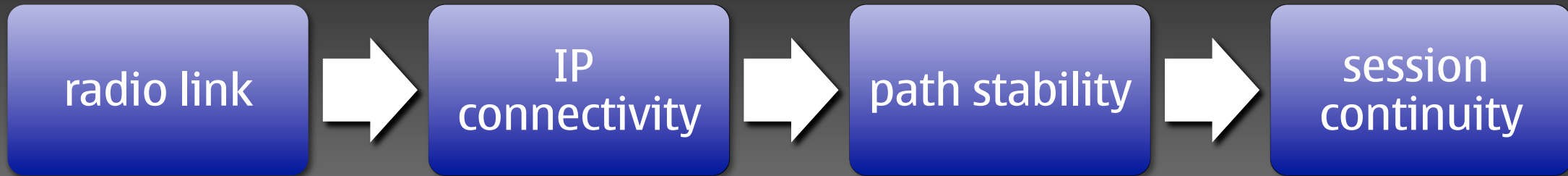
TCP needs **stable path characteristics** for decent performance

radio + IP mobility don't result in that

result: the entire mobile Internet experience is **horrible**

(note: mobile != nomadic)

Connectivity requirements: Sessions



no Internet service uses just a single simple (TCP) transfer

many (TCP) streams form a **session** to transmit & receive data that is interactively rendered in response to a user's dynamic behavior

the **entire set of connections of a session needs to work OK** for the service to be usable – over a much longer time period than a connection

e.g., no “user idle period” in Web 2.0

this amplifies the issues!

So, how should we fix the mobile Internet?

Two orthogonal propositions:

1. If something is broken, use more of it.

2. Divorce the transmission & the information.

If something is broken, use more of it

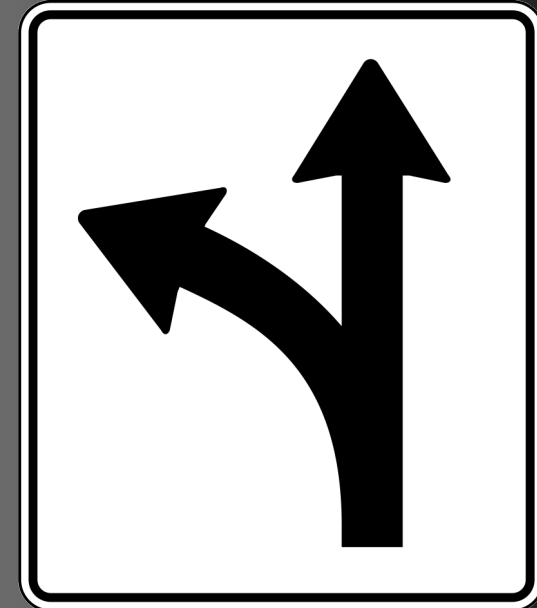
the only real way to get **robustness**
is to exploit network **redundancy**

so: use several Internet paths – via
several radios – for **one** transmission

unlikely that all of them have impaired
connectivity at the same time

extend TCP so **connection semantics**
are retained when using several paths

see: EU FP7 project  **trilogy**



Divorce the transmission & the information

information is accessed in the Internet by naming & addressing its **storage location**

or worse, it's not named at all but needs to be retrieved by executing a remote transaction

this is an outdated **anachronism** – it ties an information object to a specific way of accessing it

an information-centric architecture allows radical optimization of transmission protocols, e.g., for the mobile Internet

see: EU FP7 project PSIRP