

Tivit Future Internet Pre-Conference

Access Selection Steering and Multi-Access Showcase (WP1)

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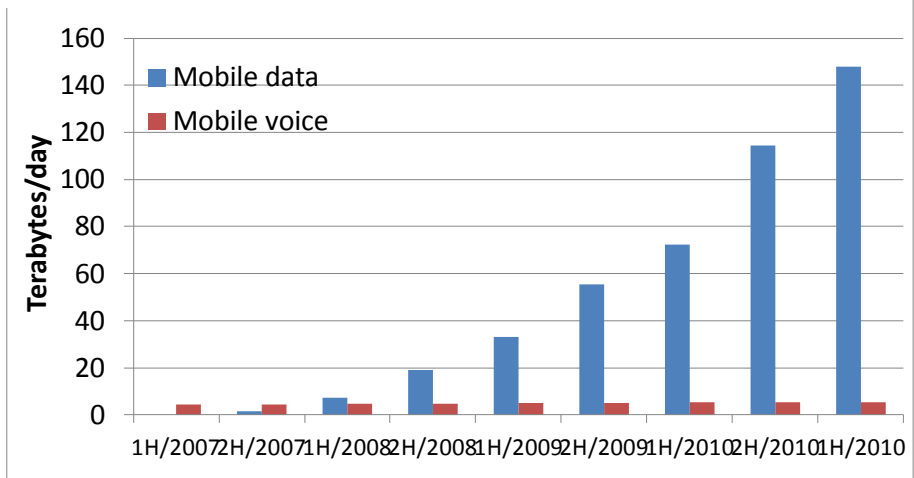
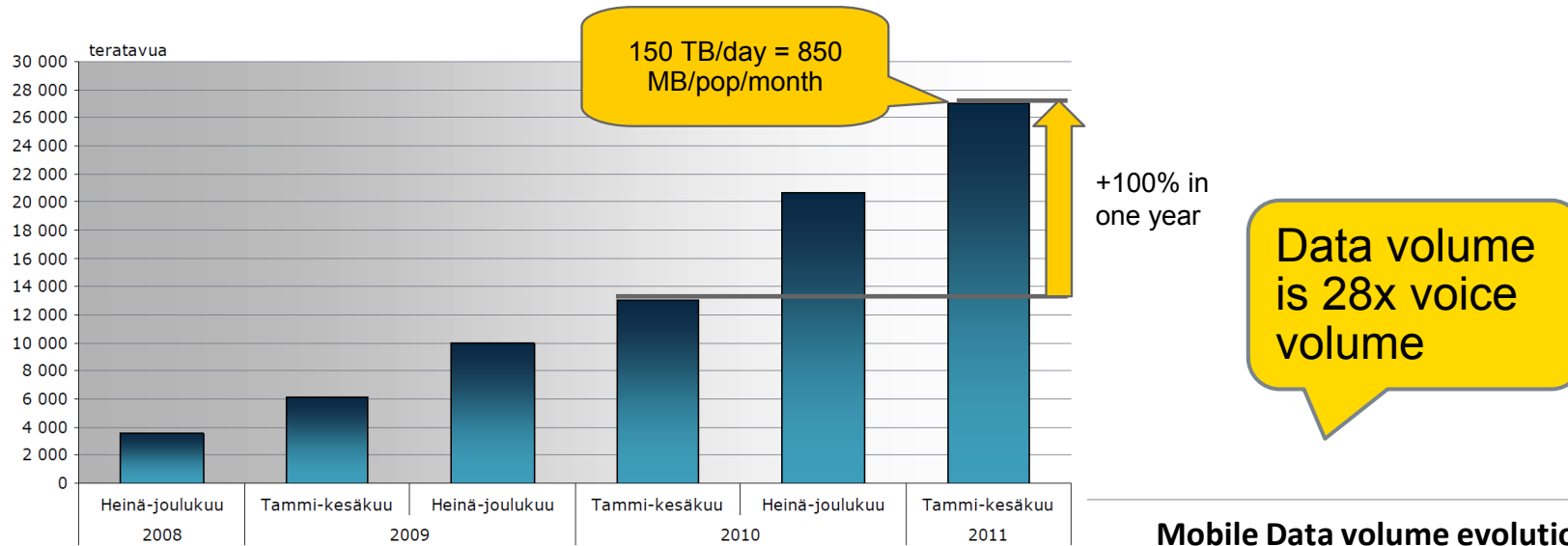
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Outline

1. Background
2. Access Selection Steering
3. Multi-Access Showcase

Mobile Data Growth



Source: http://www.ficora.fi/attachments/62QK8WRmW/Markkinakatsaus_3_2011.pdf

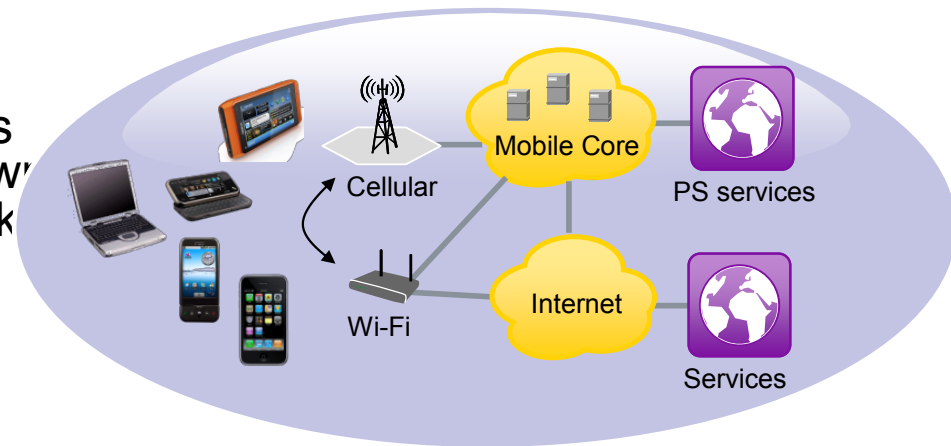
Challenges for the Operators: How to increase Network Capacity?

- Mobile data grows, revenues not
 - The majority of traffic originates indoors, e.g. from home
 - Most of the new devices support Wi-Fi
 - For small-cells segment, Wi-Fi is reasonably cheap to deploy and operate
- ▶ **Operators are highly interested in Wi-Fi offloading**



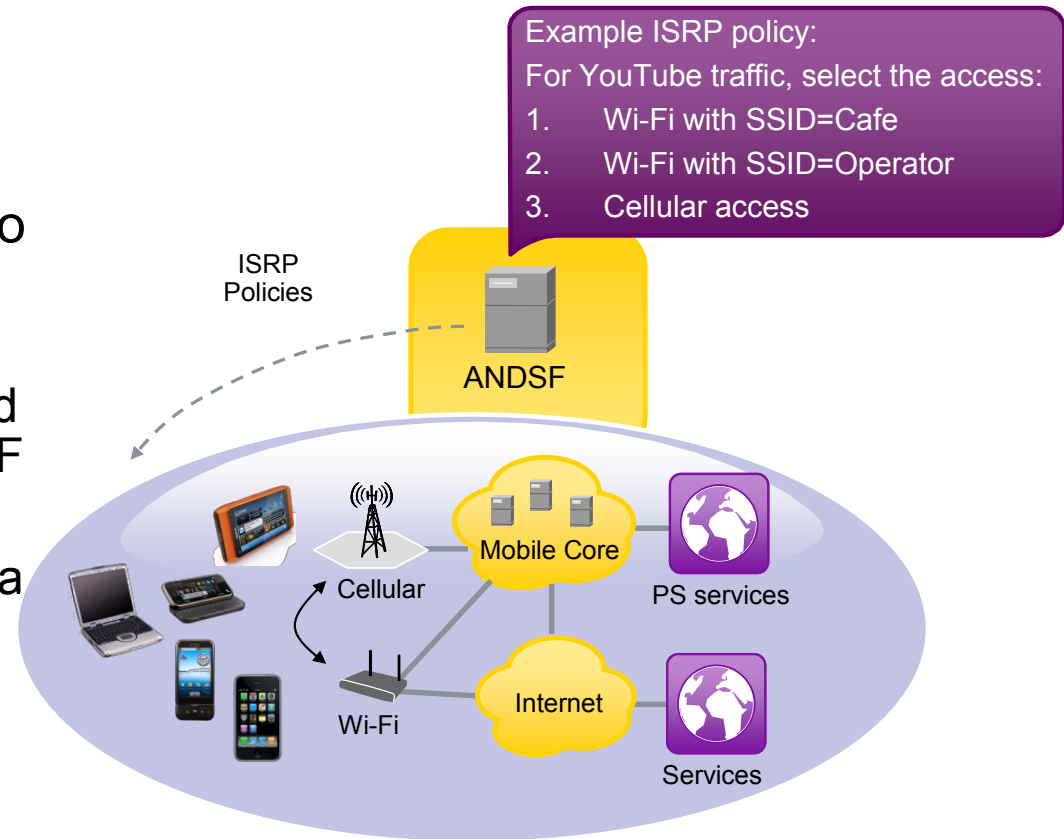
Why to have Access Selection Steering?

- Cellular networks are fully NW-controlled for access selection
- For Wi-Fi, the device is in charge
 - However, operators would like to have some degree of control also for Wi-Fi usage
 - For example, an operator wants its subscriber to use the operator's own Wi-Fi network, or partner's network
- Different mechanisms:
 - 3GPP ANDSF
 - Wi-Fi Alliance HotSpot 2.0
 - IETF mechanisms



Access Selection Steering Mechanisms, ANDSF

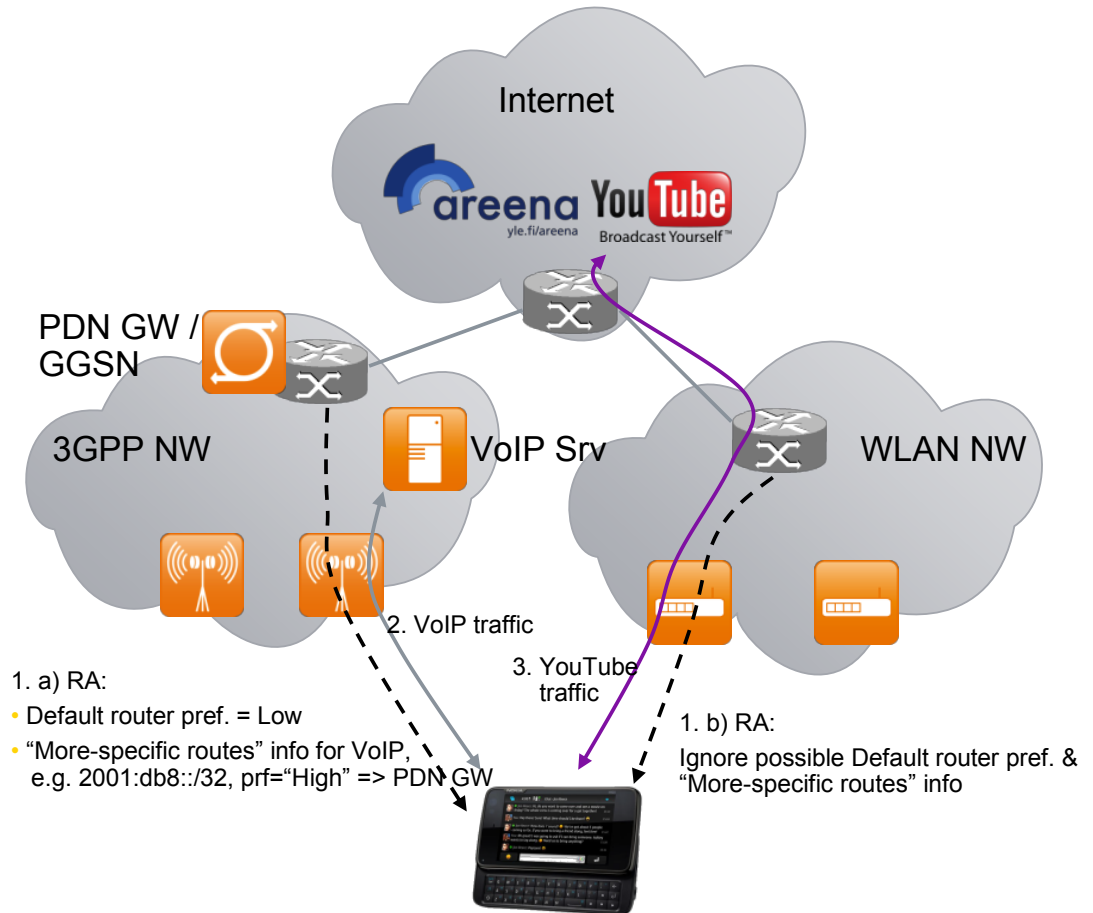
- The ANDSF server can provide network discovery information and network selection policies to the UE
 - The OMA DM (Device Management) framework is used to define and provide the ANDSF information and policies to Ues
 - UE' s internal configuration has a precedence over ANDSF policies
- **ANDSF enables cellular operator to influence also non-3GPP access network usage**



ANDSF – Access Network Discovery and Selection Function

Access Selection Steering Mechanisms, IETF

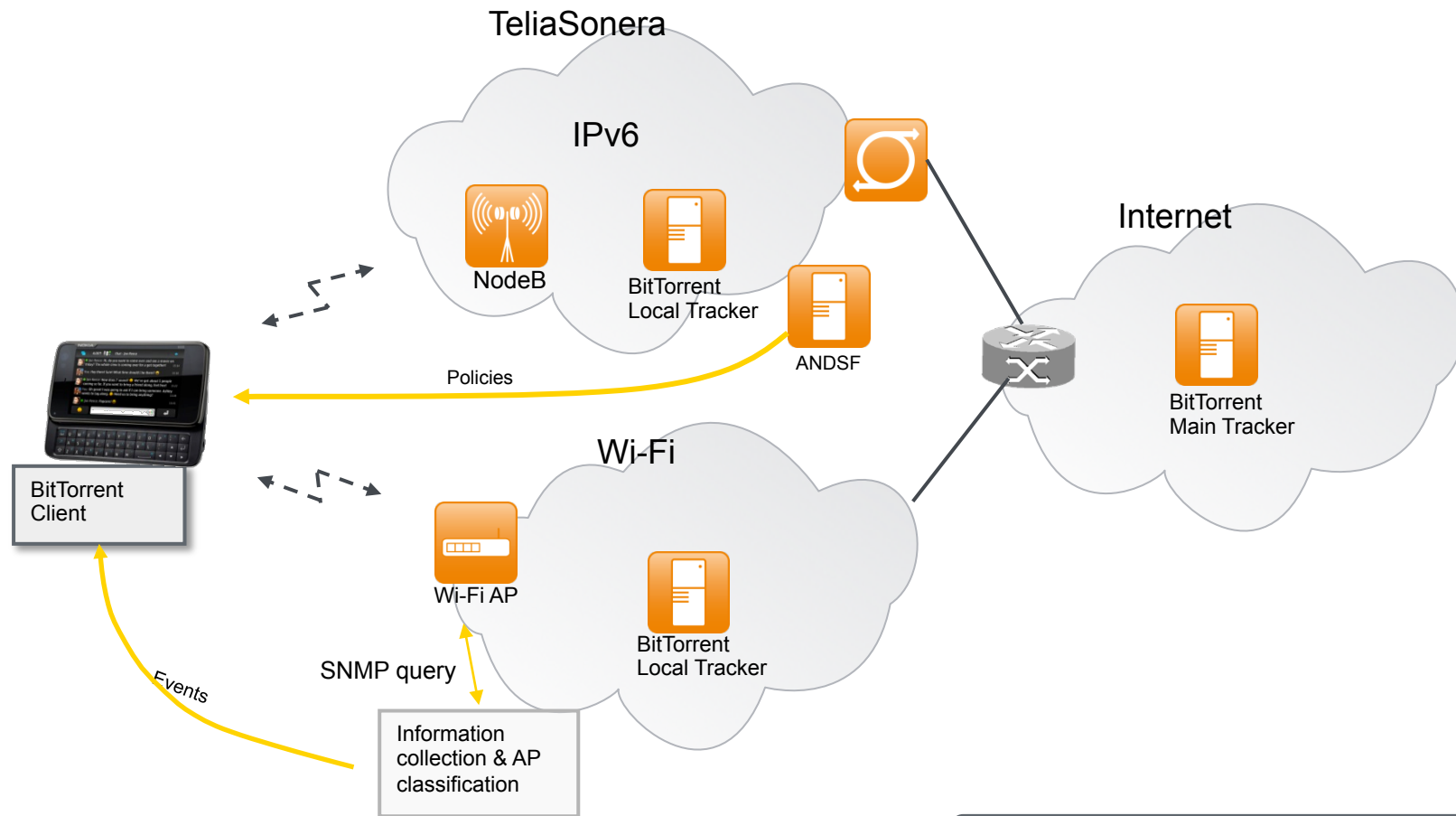
- Within IETF, there are a number of mechanisms suitable for access selection steering, e.g.
 - Router Advertisement (IPv6)
 - DHCPv6, DHCPv4
- The basic logic is the same for all mechanisms:
 - Network tells to the device what first hop router should be used for certain traffic / all traffic
 - When having first hop router(s) behind different radio accesses, it is possible to steer some traffic via Wi-Fi while some other traffic goes through cellular access
- However, IETF mechanisms can only be used **after** a connection is established, i.e. some other mechanism needed for initial access selection



Multi-Access Showcase

- Nokia, NSN and VTT together developed a Multi-Access Showcase for FI WP1
- Demonstrates the access selection steering mechanisms in practice with BitTorrent as user application
- Further, VTT has implemented enhancements on BitTorrent client and these can be demonstrated with the showcase setup
 - The client reacts to changes made by the access selection steering mechanisms by initiating a new peer resolution process.
 - As a result, the client retrieves the content from the closest source in the selected access network (i.e. uses only the preferred network).

Multi-Access Showcase Architecture



Abbreviations:

ANDSF	Access Network Discovery and Selection Function
NodeB	3G Base Station
SNMP	Simple Network Management Protocol

Multi-Access Showcase with Distributed Decisions

- VTT's access selection mechanism uses three-tier fuzzy-based network classification method (AP capabilities, MN capabilities and Application capabilities in the particular network).
- In this method, preferences about available wireless networks is provided by Distributed Decision Engine (DDE).
- DDE is a concept which can collect and distribute information and make decisions with suitable algorithms (in this context we use fuzzy logic).
- With distributed decisions it is possible to perform load balancing/offloading based on network load and operator policies.
- The distributed decision mechanism complements nicely e.g. ANDSF: ANDSF provides general network selection policies, VTT's DDE takes the local environment into account
=> optimum network selection

Multi-Access Showcase Scenario Architecture with Distributed Decisions

- The BitTorrent client interactively reads changes in the network selection preferences via DDE. Based on the preferences client may use two access networks simultaneously or only the best access network.

