Role of pure network operators

TKK Telecom Forum

Varatoimitusjohtaja Ilari Anttila, Digita Oy

22.11.2005

Role of pure network operators

- **Who are we?**

- **About the changes that are taking place**

- **Network sharing - why?**

- **Why is Flash OFDM @ 450 MHz such a promise?**

- **Wireless broadband – why now?**

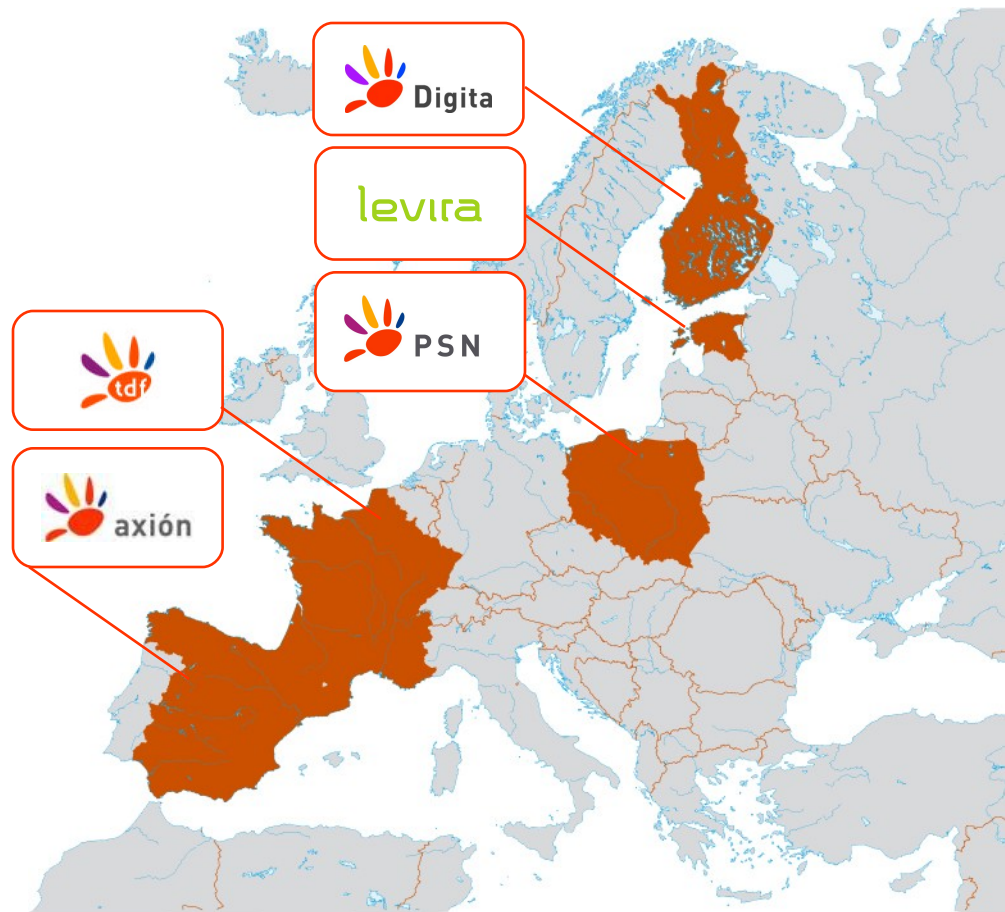- **450 - Our plans and current status**

Digita is part of the international TDF Group

- Turnover 89 M€ in 2004
- 374 employees
- Owner TDF Group

- TDF Group turnover 926 M€ in 2004
- 4150 employees
- Owners Charterhouse Capital, CDC Equity, Caisse des Dépôts et Consignations, employees

Shared broadcasting infrastructure all over Finland

- Network supervision and maintenance 24 h all over the country
- 38 main stations
- 200 mast sites
- 1000 transmitters
- MW radio link network of over 30 000 km

Content

Digita

Recipient
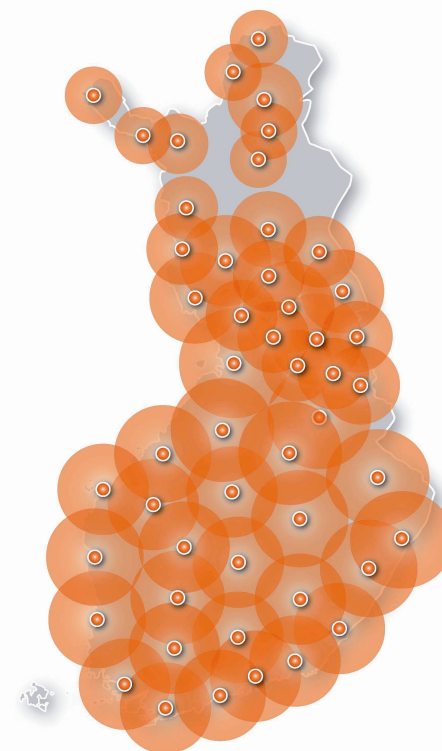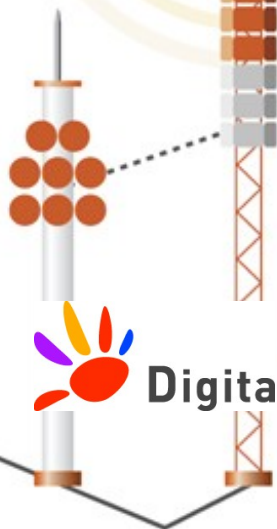
At your service

Transmission of analogue radio and television programmes

Digital television

- Network capacity
- Digita Presence: Mini Licence, OAD via DVB-T-networ **SHARED**
  MHP transmission service **NETWORKS**
- In future also: mobile TV (DVB-H) and HDTV

To be launched soon: Wireless broadband with 450 MHz Flash OFDM
- Network capacity

Network and site services
- GSM, 3G, WLAN
- Network design, implementation and maintenance
  all over the country, Network Management

Other services: Positioning: Fokus, Paging: Digita DARC

Profound change is continuing

Three strong sources

- **Technology development and convergence**
- **Regulatory development**
  - removal of industry specific legislation and encouragement for competition
- **Changes in consumer needs and behaviour**

Possible obstacles

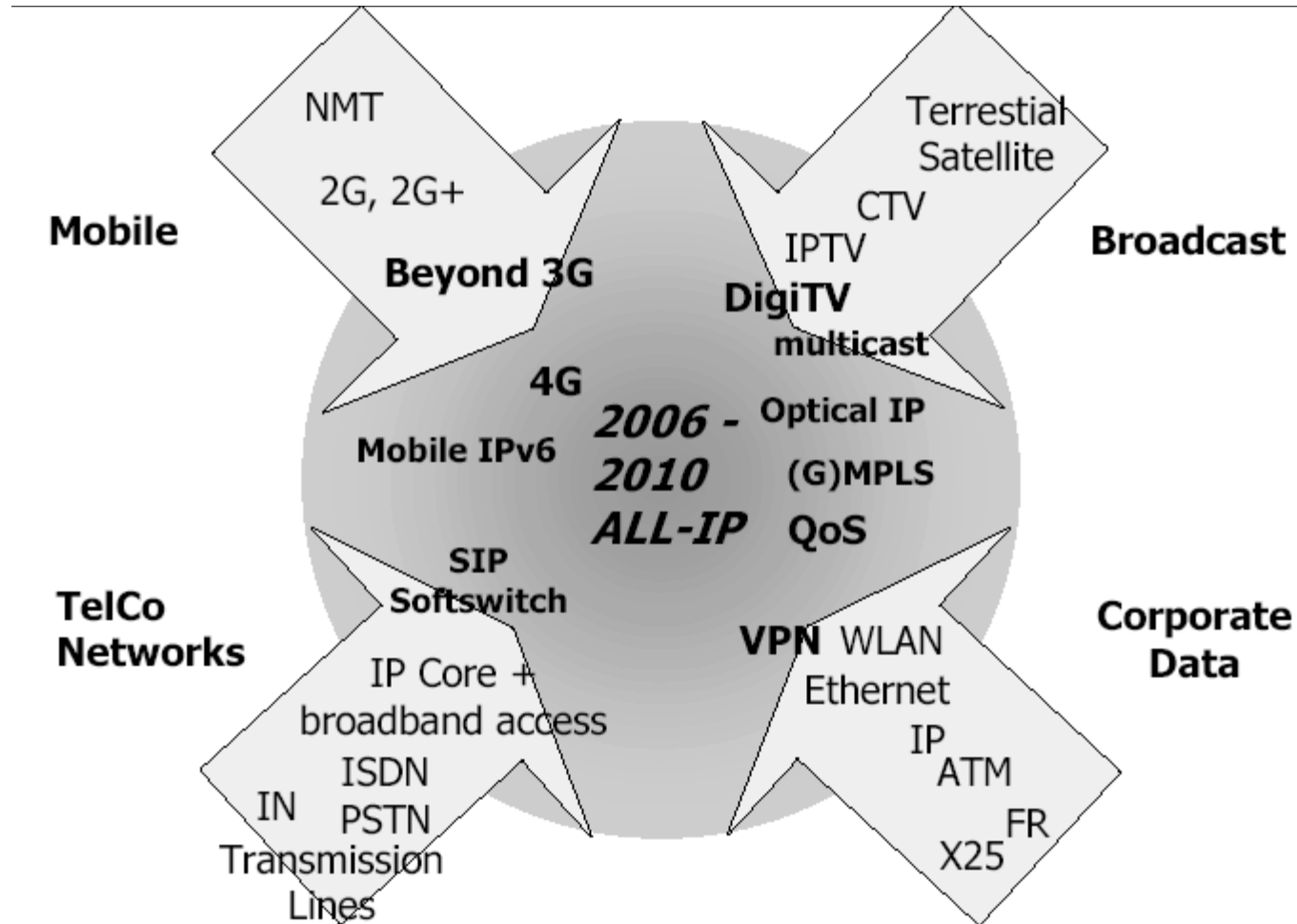- **What is needed is sound business models and a real competitive edge**
- **Surprising changes in consumer behaviour**
- **Security, security and security**

Digita

Content – Distribution – Terminal chain will be brok

DTech Pauli Heikkilä
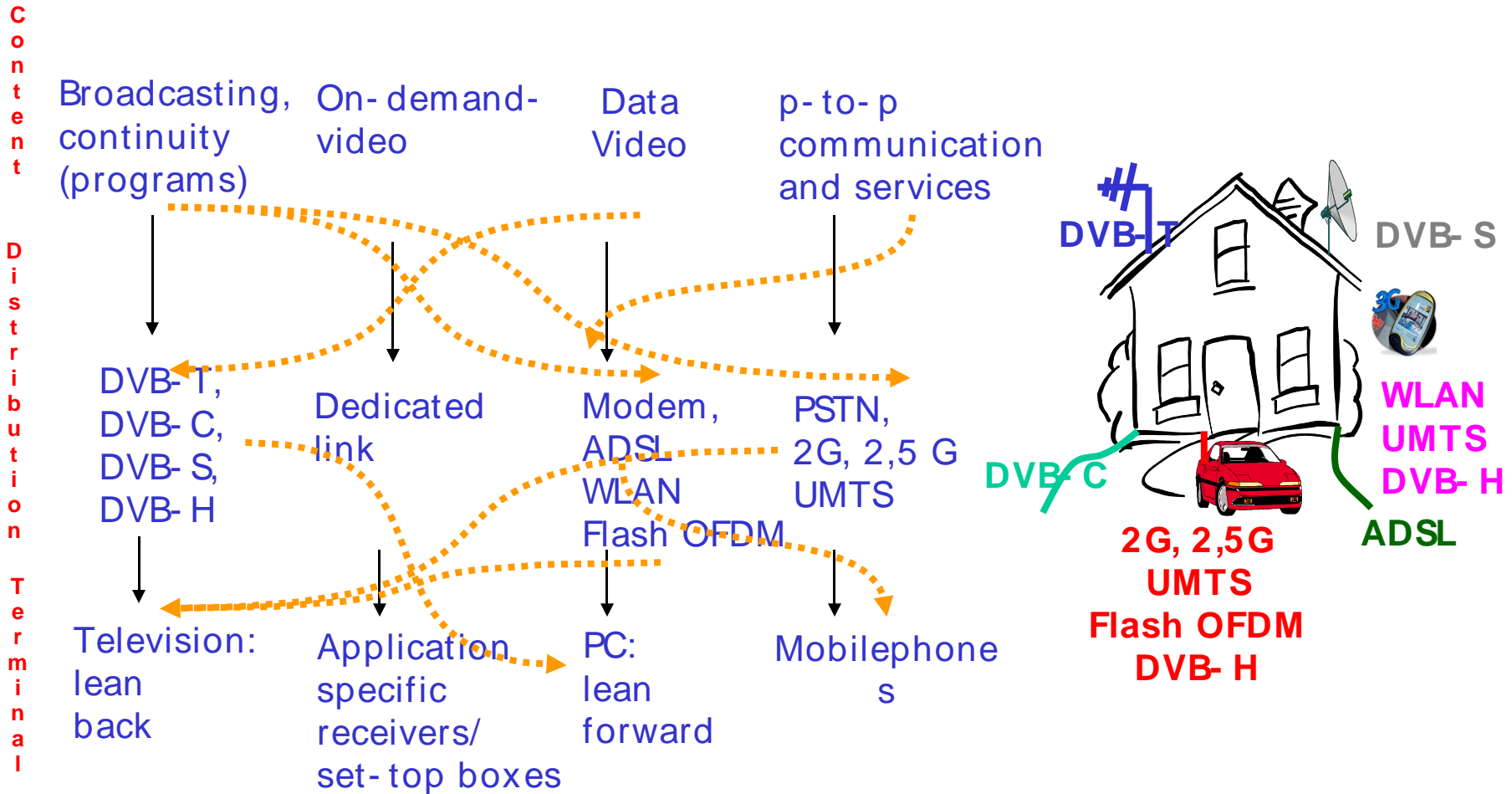
"Past: IP on everything , Present: IP under everything and Future: IP runs over everything", Venton Cerf

Prof. Pauli Kuosmanen

Ilari Anttila: Role of pure network operators

From value chains towards value networks

Content producers
Content packagers
Customer groups
Retail chain
Network operators
Service operators
Customers
System suppliers
Shared Network operator
Network contractors
Infrastructure providers
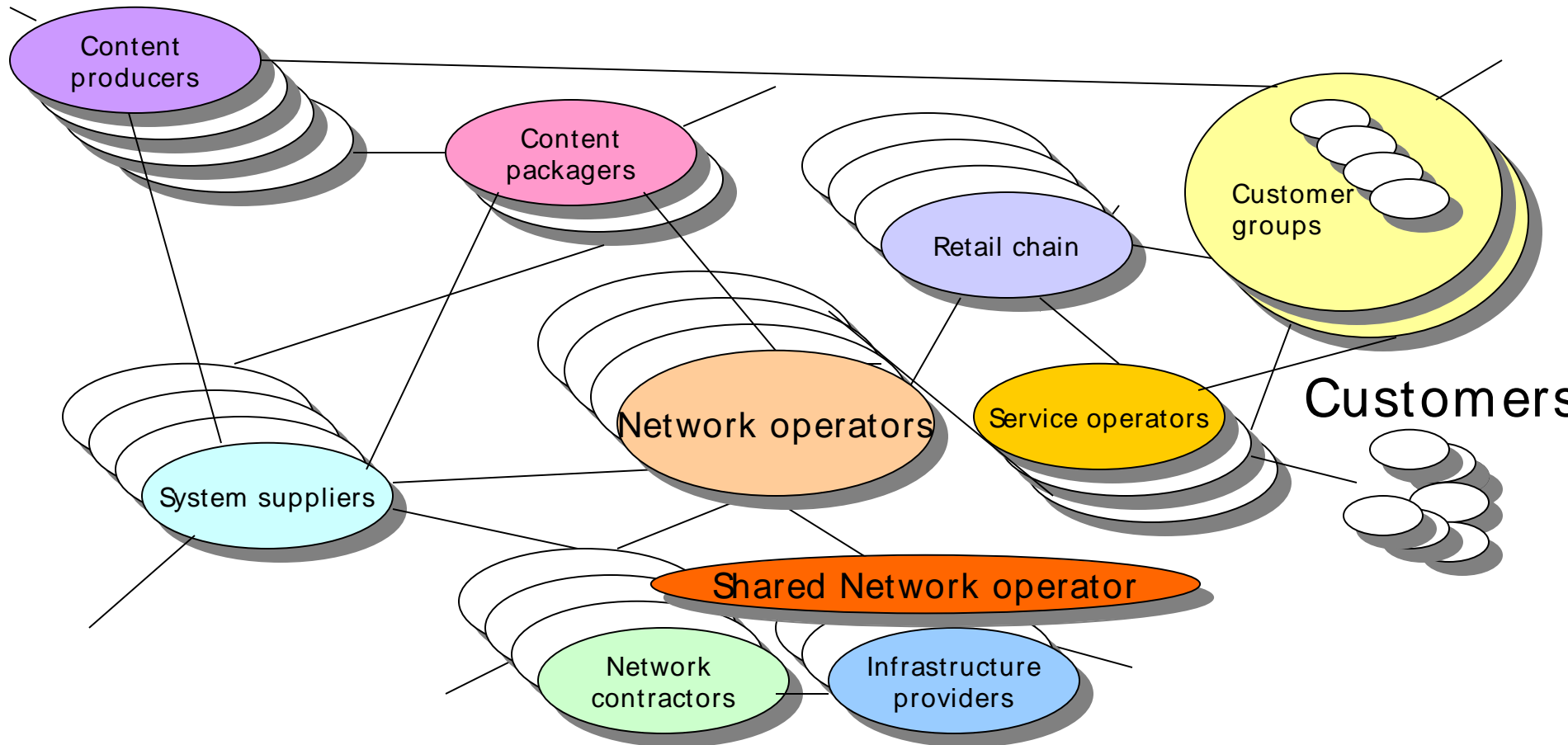
- *Concentrate on your core competences*
- *From vertical integration towards horizontal structures*

True network sharing models bring the largest benefits

−
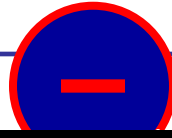
- − Masts / sites often overloaded
- − Same coverage with shared antennas (Need to expand the transmission network)
- − Significant increase of RF exposure
- − Capex and opex savings are minimal

- − High level of dependency from competitors / free- rider risk
- − Difficult to expand and to develop
- − License requirements not reached
- − Difficult to achieve equilibrium between operators

- − High coordination to open a site
- − No capacity pooling gains
- − No optimization of RF exposure
- − Capex and opex savings are not

- − High coordination in roll out
- − Frequency sharing may requi regulator agreement
- − Lesser ability to make major changes to roll- out policy

Common shared Network

UTRAN sharing

Geographical sharing

Mast / site and Antenna sharing
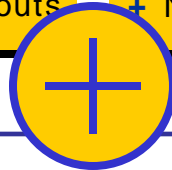
- + Simple, quick, known
- + Savings from infrastructure Costs

- + Economically efficient in theory
- + Operators have individual coverage areas
- + Theoretically no coordination in roll outs

- + Own frequencies = compliant to regulation in many countries
- + Savings from purchasing and maintaining BS
- + Each operator may customize its coverage
- + N core networks

- + **Highest level of cash flow savings, especially in the first 5 years (launch phase)**
- + **Highest level of Capex savings**
- + **Larger coverage area is achieved faster**
- + **Best sites re- used**
- + **Efficient use of frequencies**
- + **Optimization of RF exposure**

+

Digita

Ilari Anttila: Role of pure network operators

Roles in DTT - Horizontal markets

Advertisers

Content providers

YLE

Program licence holders

MTV3

URHEILUKANAVA

Games

Shopping centre

Info-services

Sells/ rents ⇕ capacity

Network operator - licences (Digita)

Network capacity

Network capacity

Network capacity

Sells networks

Network infrastructure (Digita)

Digita

Ilari Anttila: Role of pure network operators
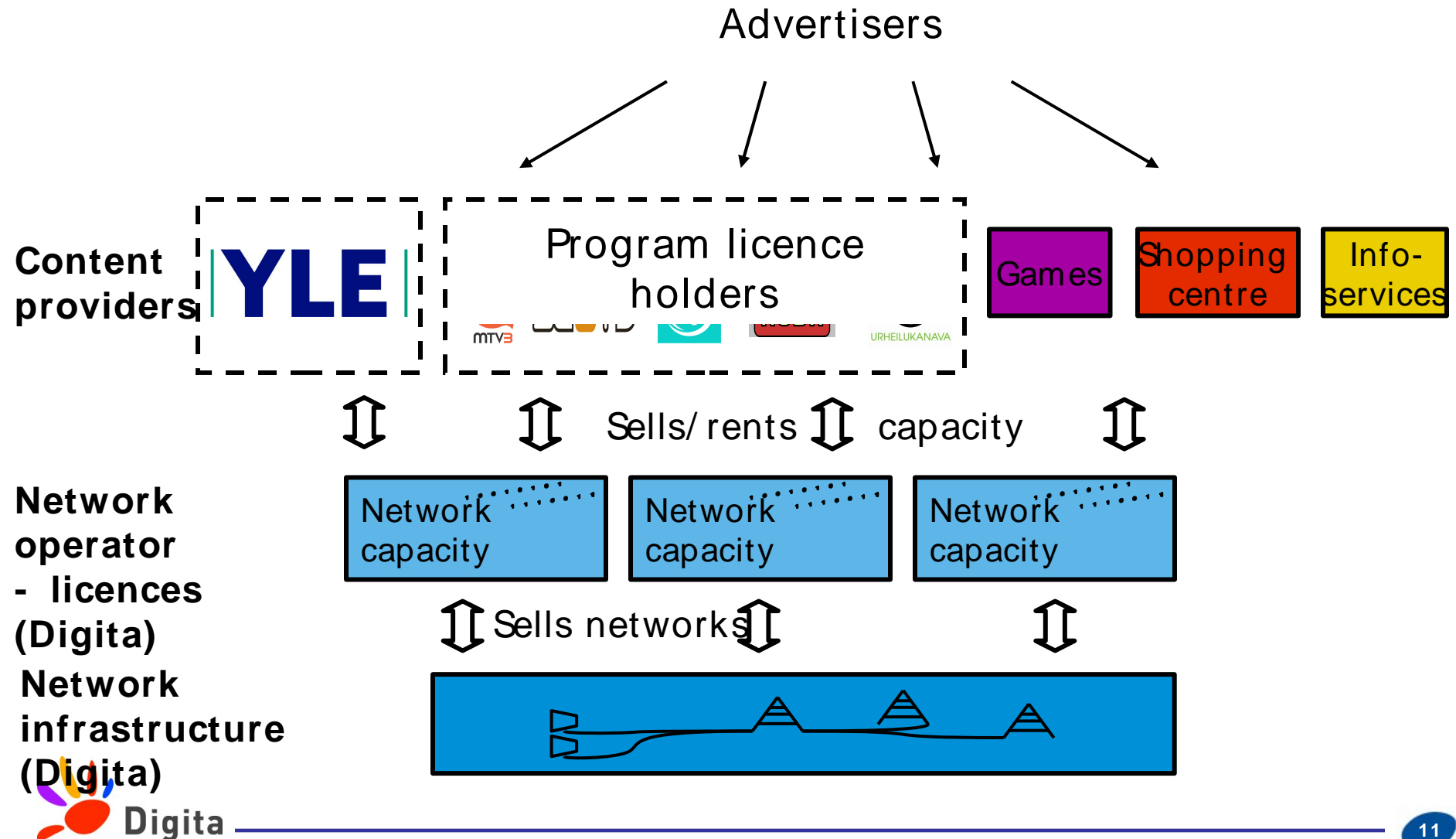
Broadcasting network technical services
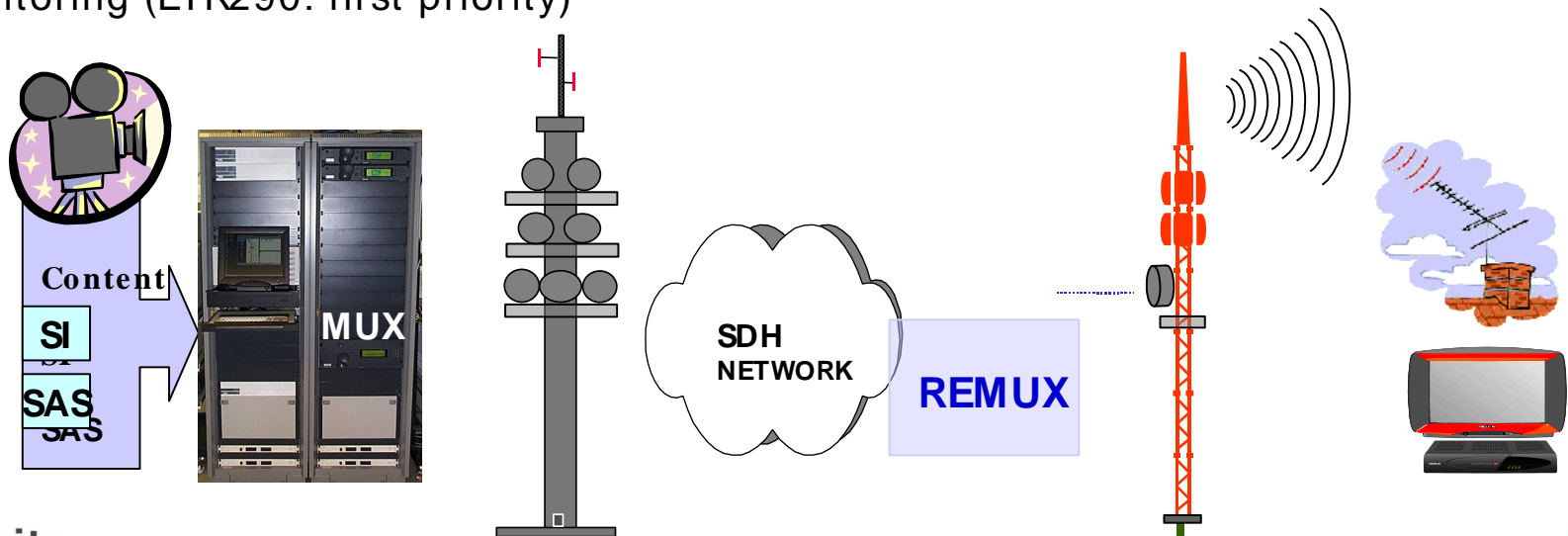
National Center
- encoding
- statistical multiplexing
- DVB subtitling
- SI editing and insertion
- multiplexing and scrambling
- system management
- Object caroucel
- IP Encapsulators
- network adapters
- monitoring (ETR290: first priority)

Regional sites
- local encoding
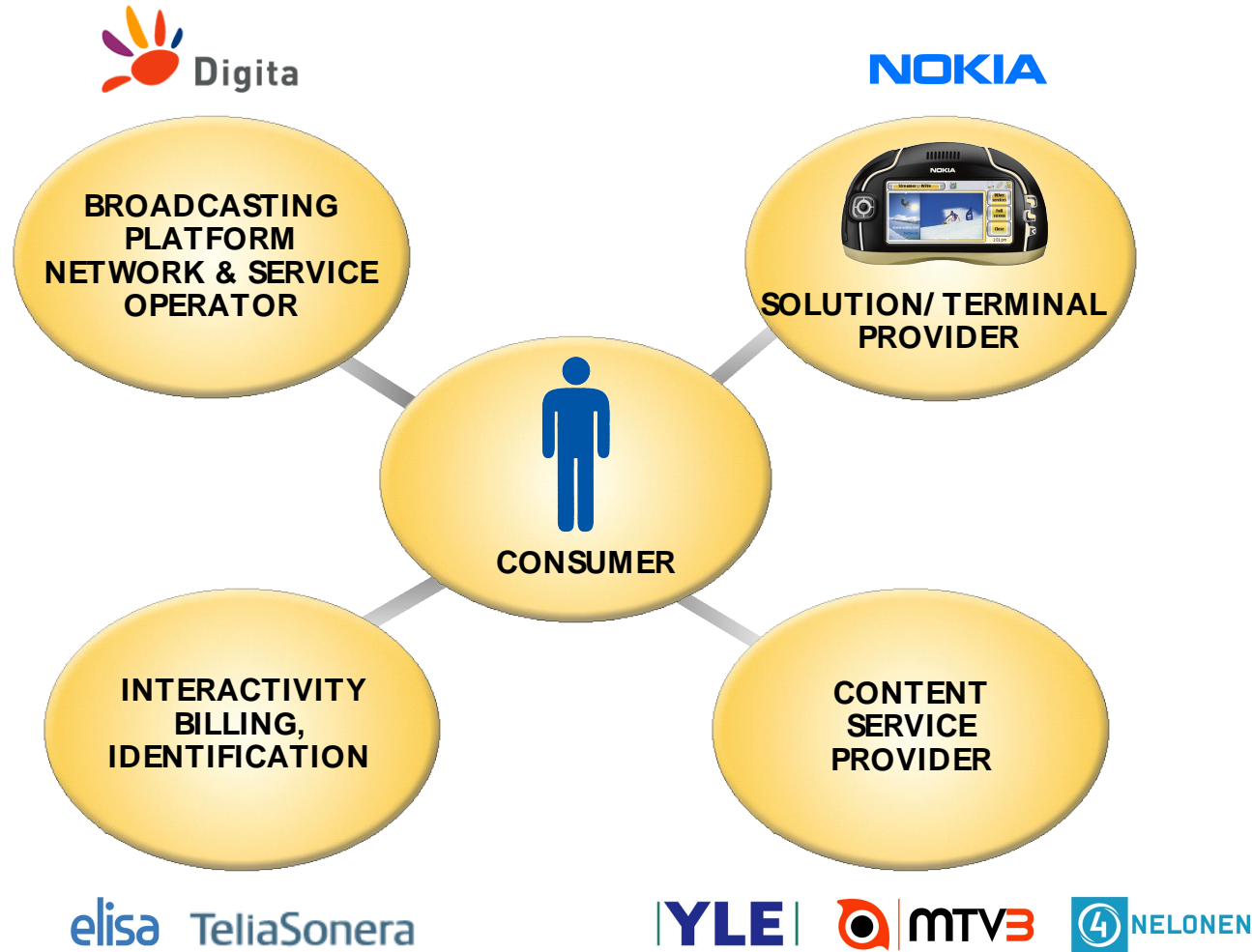- remultiplexing/ local insertion (partially implemented)
- SFN synchronization
- network adapters
- monitoring

Transmitter sites
- transmitters
- antennas
- channel combiners
- network adapters
- reserve generators
- simulcast analog services
- monitoring

Content

SI

SAS

MUX

SDH NETWORK

REMUX

Ilari Anttila: Role of pure network operators

Mobile TV - Roles in the pilot business set- up

Finnish Mobile TV platform in a nutshell

Pay- TV rights

TV content, metadata

Nokia IPDC
Service Solution

Streams,
service guide

Digita
DVB H

elisa
GSM

Nokia IPDC
E- Commerce
System

Pay- TV rights

Nokia IPDC
E- Commerce
System

TeliaSonera
GSM

Pay- TV rights

FINNISH
MOBILE TV
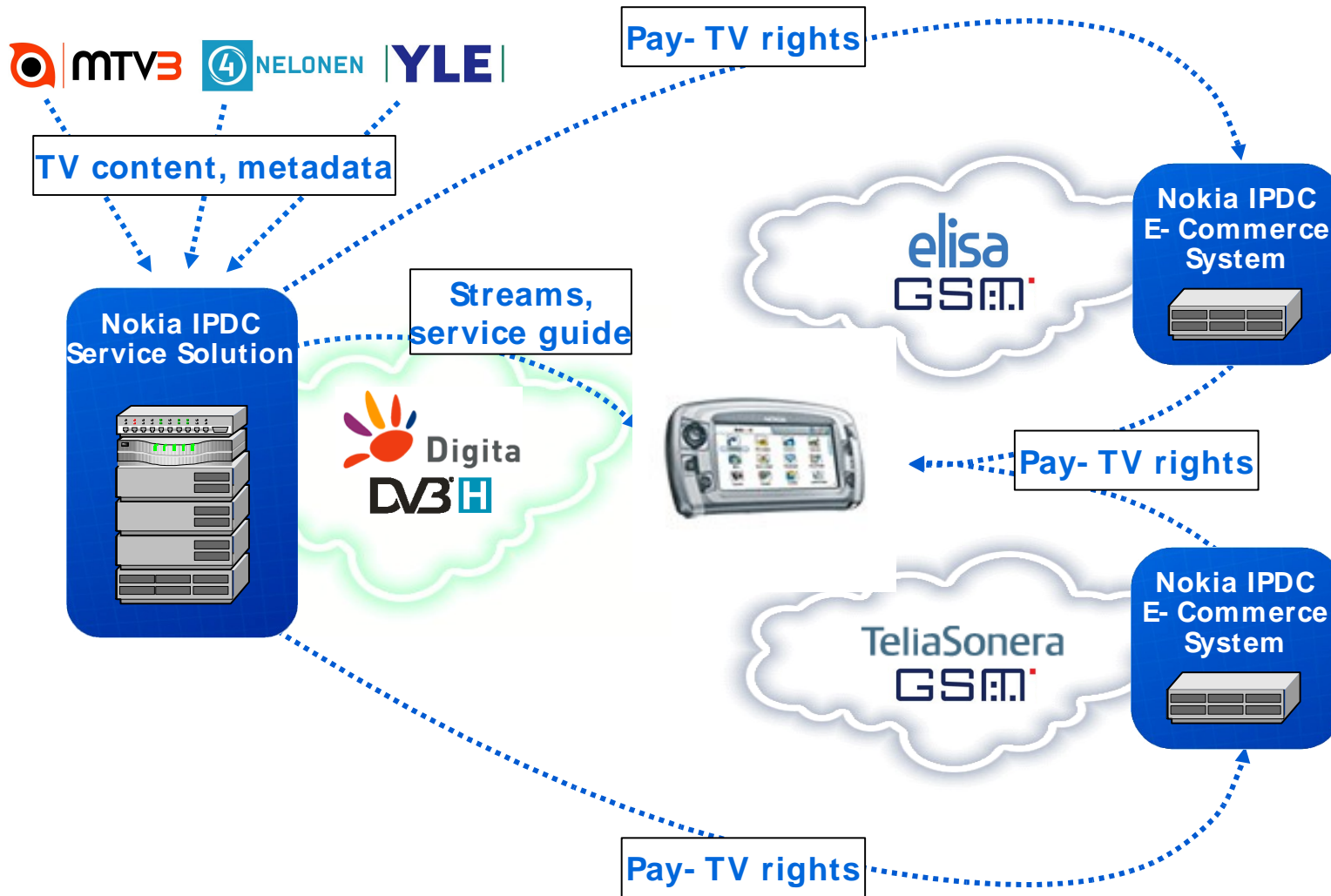
450 - Digita's principles as a shared network operator

- **Digita is strictly a shared network operator**
  - Digita operates the radio access network and parts of the core
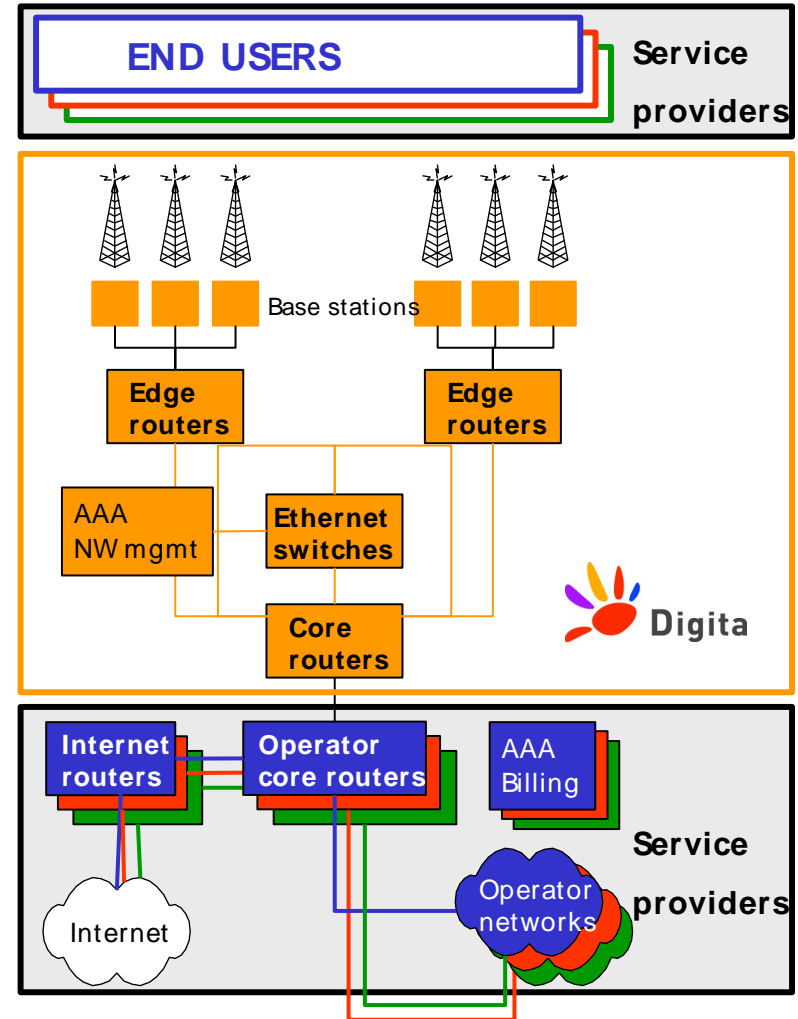 - Operations strictly in the b-to-b (or operator to operator) segment
  - No intention to set up a service operator

- **Digita's customers are other network operators / MVNOs / Service operators**
  - Will provide the most cost efficient solution as there are fewer overlapping investments
  - Network capacity is offered to all interested parties on equal terms
  - Interconnection between the 450 network and existing networks will take place through these network operators / MVNOs

- **The service is focused on rural areas**
 - The benefits of 450 are most prominent in sparsely populated areas
  - Densely populated areas are better served through UMTS / Wimax / ADSL

END USERS — Service providers

Base stations

Edge routers

Edge routers

AAA NW mgmt

Ethernet switches

Core routers

Digita

Internet routers

Operator core routers

AAA Billing

Internet

Operator networks

Service providers

Ilari Anttila: Role of pure network operators

What is Flash- OFDM

Broadband and Interactive
- – 3 Mbps downlink peak data rates
  - • Typical 1 - 1.5Mb per user
- – 900 Kbps uplink peak data rates
  - • Typical 300 - 500Kbps per user
- – Average packet latency 50 milliseconds
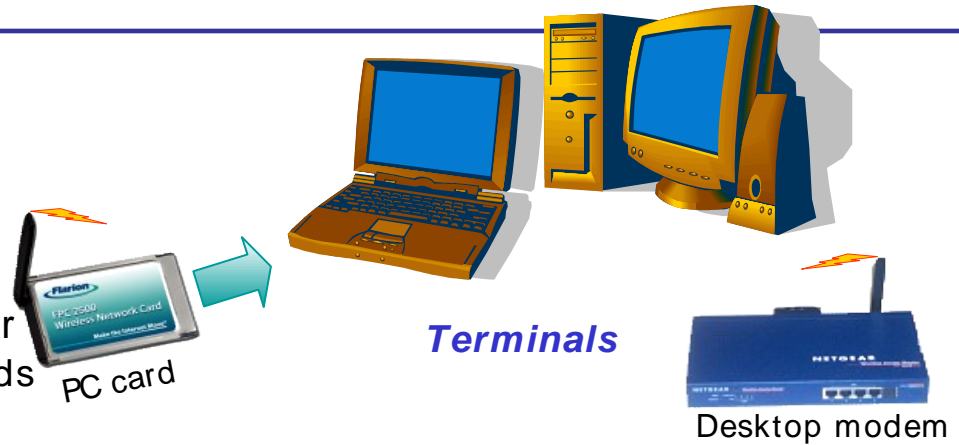
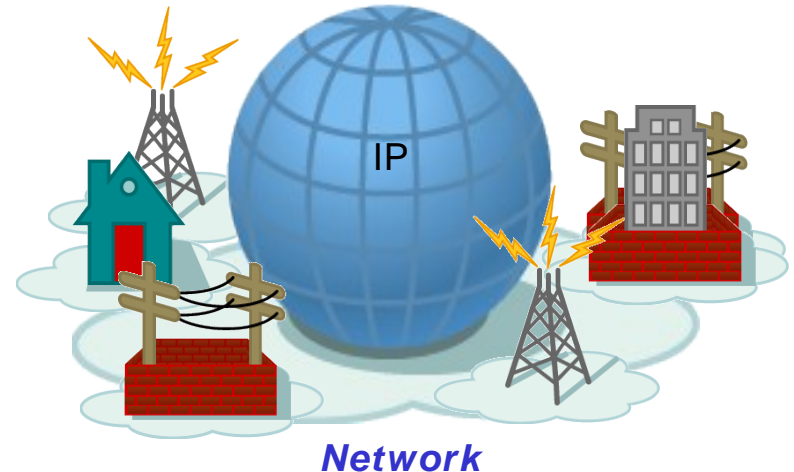Always- on Wherever You Are
- – Seamless wide area coverage, vehicular mobility
- – IP based mobility - interoperable with 802.11

Standard IP
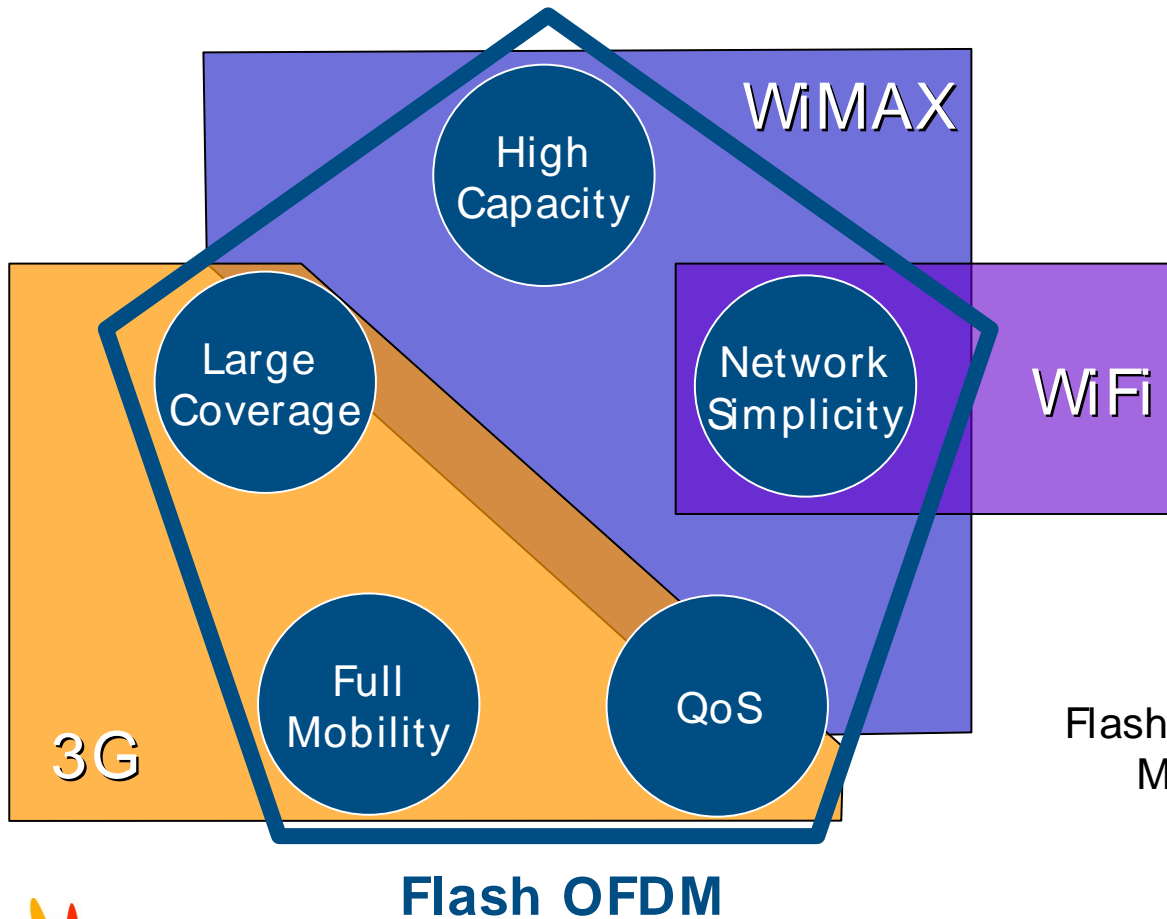- – No changes to IP network, host device, applications or content
- – Leverage IP infrastructure, devices and channels

PC card

Terminals

Desktop modem

IP

Network

Source:

Flarion

Digita

Ilari Anttila: Role of pure network operators

Technology Positioning

WiMAX

High Capacity

Large Coverage

Network Simplicity

WiFi

Full Mobility

QoS

3G

Flash OFDM

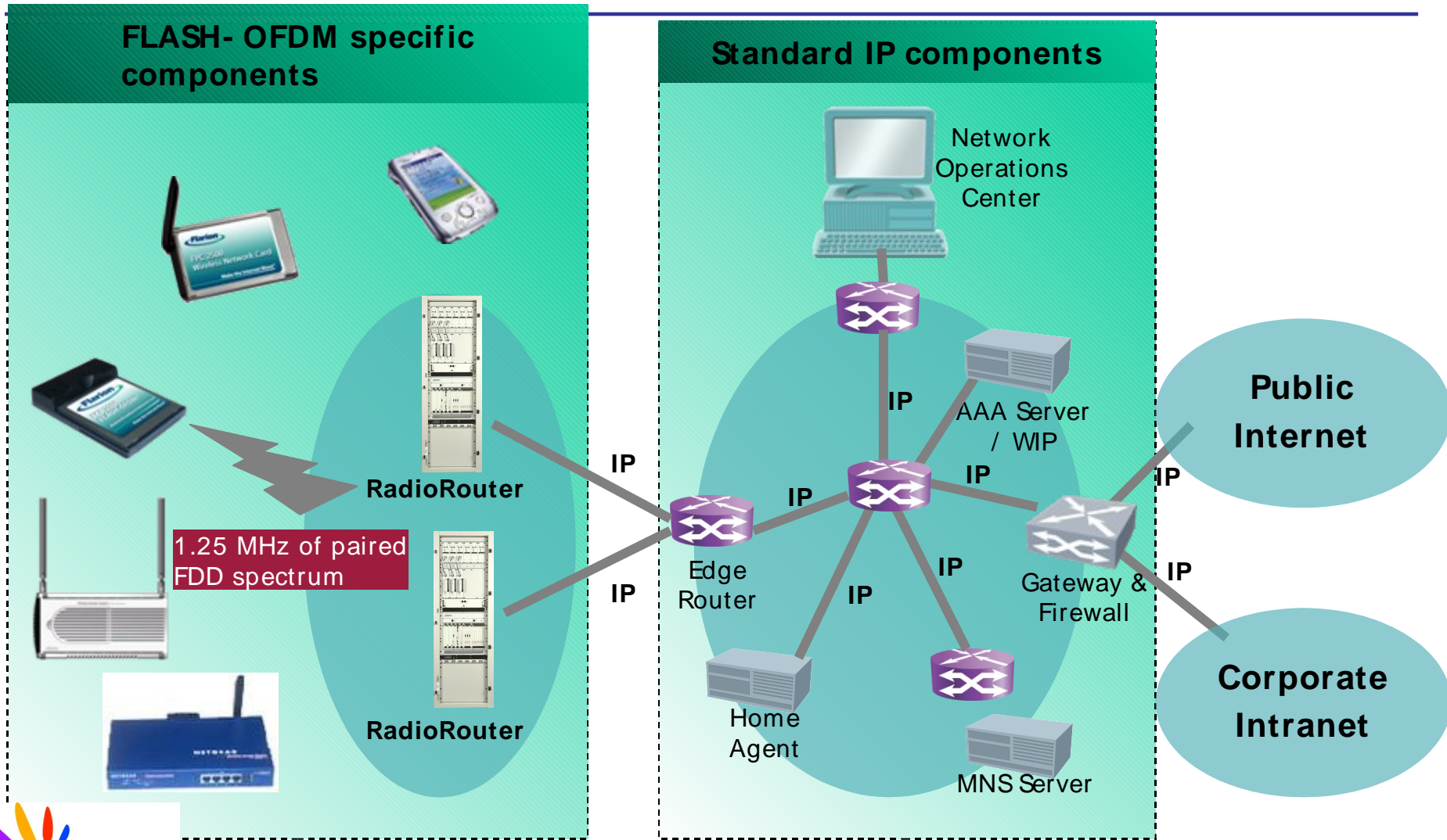**WiFi – Simplicity but no Mobility**

3G – Mobility & Coverage but Complex

WiMAX – Simplicity and Capacity but no Mobility/ Coverage

Flash OFDM – Designed as a Cellular Mobile Broadband Data Network

Source:

Flarion

Digita

Ilari Anttila: Role of pure network operators

A true "all- IP" mobile network

FLASH- OFDM specific components

Standard IP components

Network Operations Center

AAA Server / WIP

IP

IP

IP

Public Internet

RadioRouter

IP

Edge Router

IP

IP

IP

Gateway & Firewall

IP

1.25 MHz of paired FDD spectrum

IP

IP

IP

Corporate Intranet

RadioRouter

Home Agent

MNS Server

Digita

450 vs other broadband access in Finland

Illustrative coverage

Level of mobility

Mobile

802.16e (mobile Wimax)

Nomadic

Wimax (3,5GHz)

HSDPA

(UMTS-

Flash- OFDM

Digita

Fixed

ADSL 2+

ADSL

Cable modem

ISDN

24M   8M   1M   256k   14,4k

Not broadband

Downlink connection speeds & applications
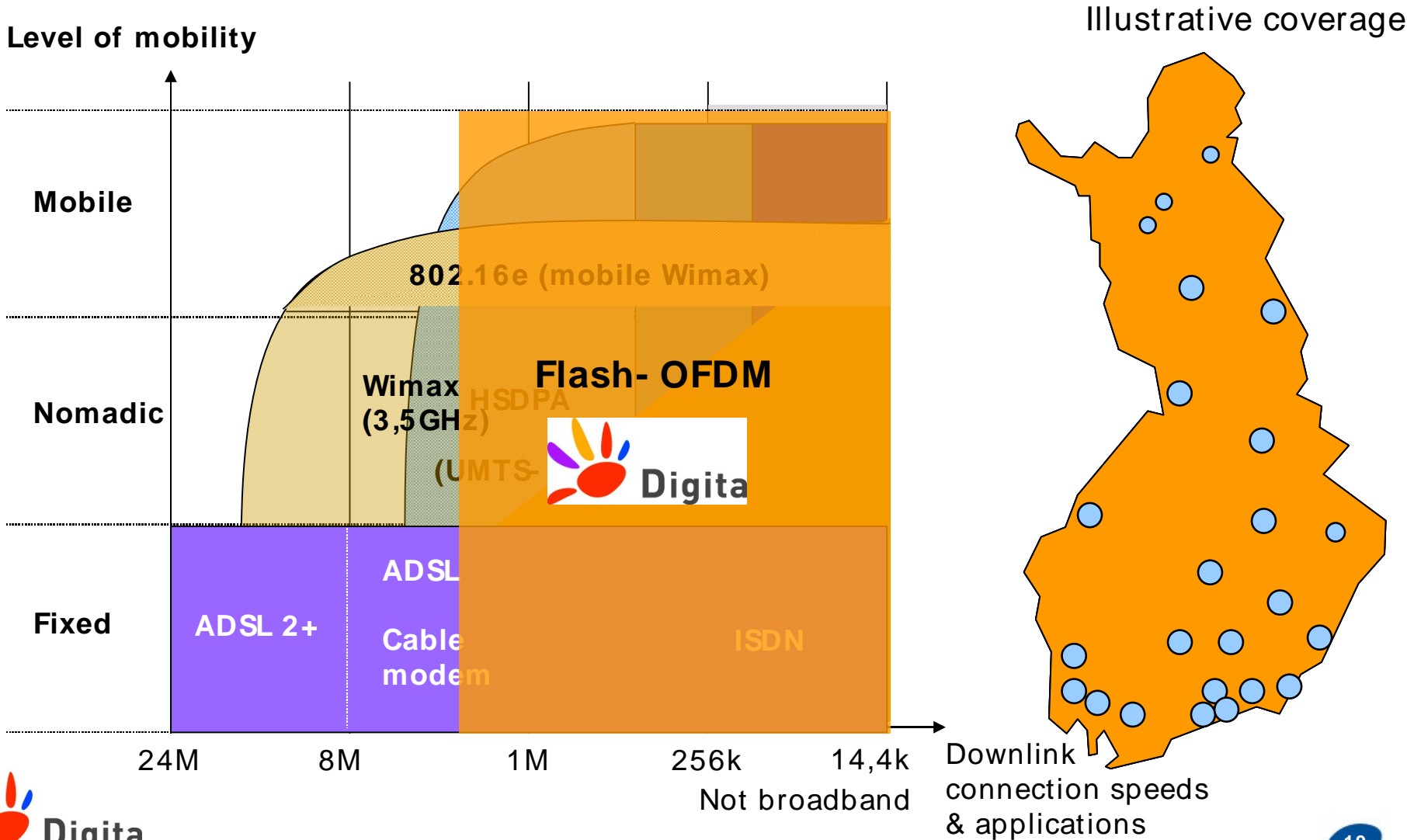
450 MHz vs. other mobile networks frequencies

Theoretical cell coverage on different frequencies

(assuming flat earth model)

Frequency	Theoretical cell radius	Cell area	Relative cell count
450	49	7512	1,0
850	29	2715	2,8
950	27	2273	3,3
1800	14	616	12,2
1900	13	556	13,5
2100	12	452	16,6

Source: ITU & Qualcomm

Ilari Anttila: Role of pure network operators

SWOT of Flash- OFDM @450 in Finland

Strengths

- True broadband speed with low latency

- Coverage with 450 MHz

- Modern all IP

- End- user experience & ease of use

Weaknesses

- Non- standard status for time being

- Limited capacity for highly populated areas

- New technology therefore limited experience from the world

Opportunities

- Enhancing the broadband access offering with ADSL and 3G

- New business opportunities for all kinds operators with shared model

- Qualcomm & Siemens support

Threats

- Delay if court process prolonged

- Remain an exotic technology

Conclusion

- 450 Flash OFDM complementing the other broadband services

Digita

Expansion of broaband clears the way for wireless broadband

Penetration%

Legend:
- PC
- Internet
- Broadband

5/05 at 36%
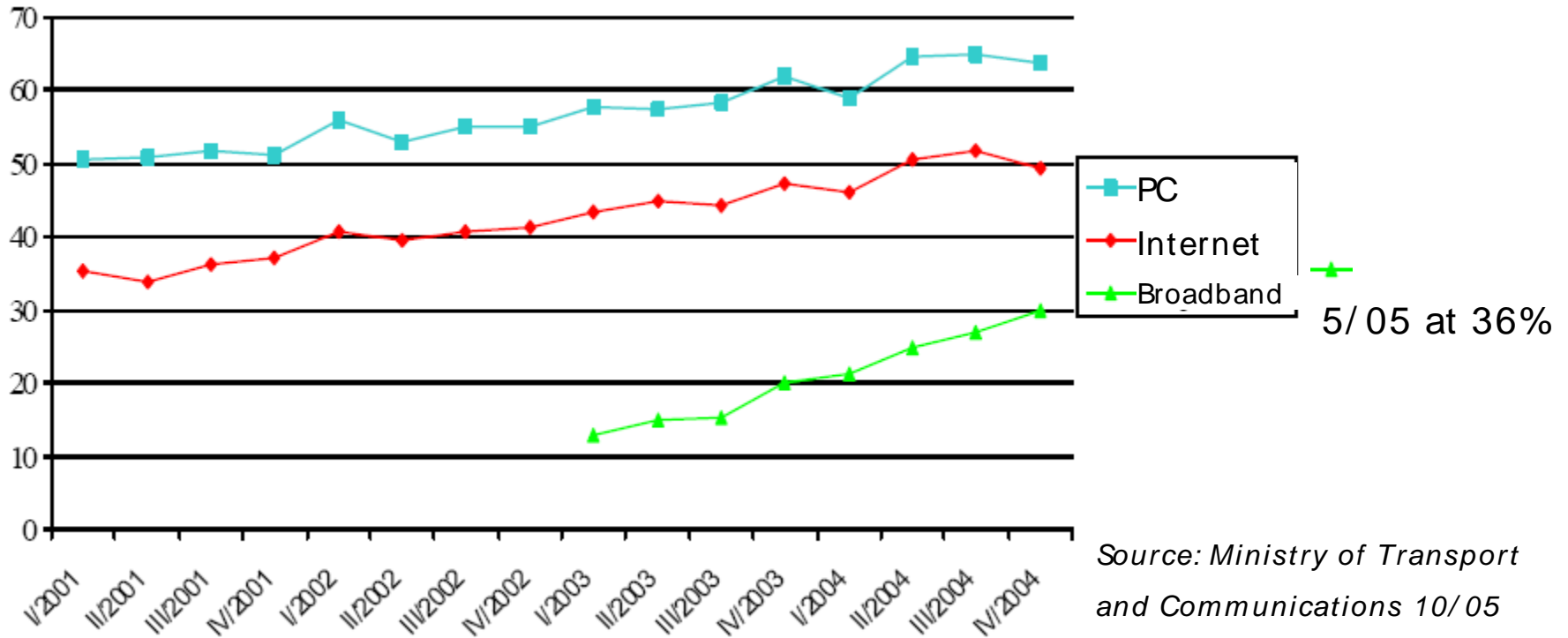
Source: Ministry of Transport and Communications 10/05

- Providing broadband access at remote areas by wireless
- Parallels:
  - Fixed voice -> mobile voice
  - Fixed broadband -> mobile broadband?

Ilari Anttila: Role of pure network operators

Need for ubiquitous broadband access is rising

- **Teens want it everywhere they go (nomadic)**
- **Business users want it everywhere (nomadic & mobile)**
- **Various industries could boost their productivity by real- time data and control**
- **Part of many of our daily lives (summer cabins, boats, etc.)**
  - how many of us takes care of their bills & other banking?
  - Email as a connection tool?
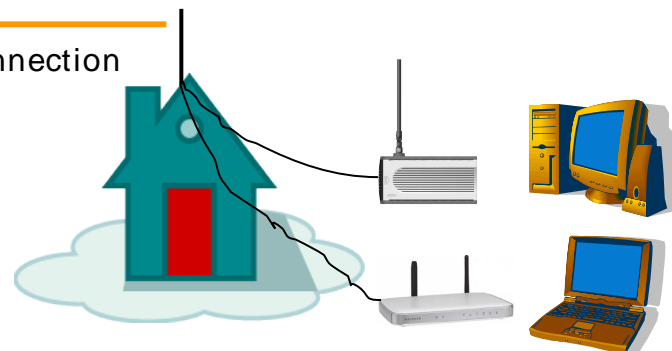 - web browsing as the first source for any information

Digita

Ilari Anttila: Role of pure network operators

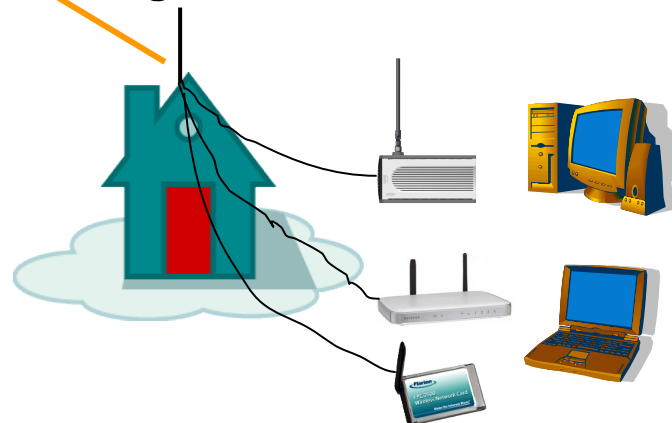# Examples of use cases for Flash- OFDM @450

Flash- OFDM Radio Router

1. Primary broadband access in rural areas

Broadband data connection

2. Complementary bb- access in e.g. summer houses

3. Portable / mobile use for business or personal use

Digita

Summary

- **Changes in the technology, regulation and consumer behaviour will change the outlook of IT/ Telecom/ Broadcasting industry**
- **New roles and viable business models are in need**
- **Sharing networks is a trend that will intensify due to the obvious benefits it will bring**
- **Flash OFDM @450 MHz in Finland will be complementing to the existing businesses of fixed and mobile broadband**
- **It may well also be the catalyst that will finally open the mobile data business for the operators**
- **Digita will provide a cost effective shared network solution with equal opportunities for all operators to offer wireless broadband**
- **First experiences of Flash OFDM in practice are promising and we are truly excited to start the roll- out and launch of this service in Finland at the forefront**