WIRELESS WORLD
RESEARCH FORUM®

# Requirements for the Next Generation of Mobile Services and Applications

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**WGB – Services, Devices and Service Architectures**

**WGA – User Needs & Requirements in Wireless World**

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# Motivation

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*"xG does not happen just by increasing capacity. We have enough bandwidth, **Users** require new **applications**/services!" 8.9.2004*

- Technologies have evolved (bandwidth, devices)
- Users and their behavior have changed
- Apps and services have exploded

# Users now and in future

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- Generations of users
  - Post war generation (born in 40s - mid 60s)
  - X-Generation (mid 60s – early 80s)
  - Y-Generation (early 80s – mid 90s)
  - Z-Generation (late 90s-)
- X-Generation users are digital immigrants
- Y/Z-Generation users are digital natives, Millenials
  - Z-Generation more “social”

**Tienari J. & Piekkari R.**

# Millenials

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- New generations have been researched in sense of education and working life aspects
- Information age mindset
  - Computers aren't technology
  - The Internet is better than TV
  - Staying connected is essential
  - Multitasking is a way of life
  - Doing is better than knowing
  - Zero tolerance for delays
- Different values and active challenging

Oblinger D.

# Basics for the user needs

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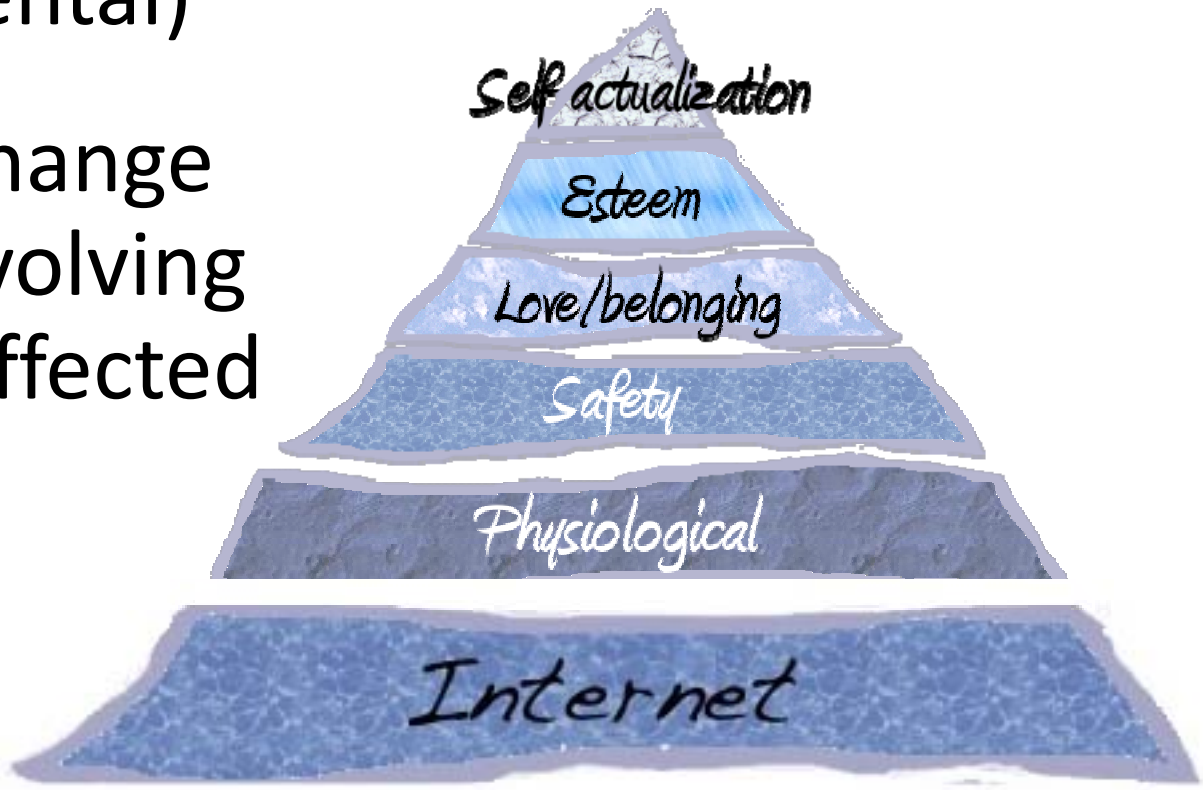
- Psychologist A. Maslow characterized user needs in various levels
  - Human tries to satisfy the basic needs first (physical -> mental)
  - How has the change of users and evolving technologies affected this model ?




**Yang Y et al**

# Implications

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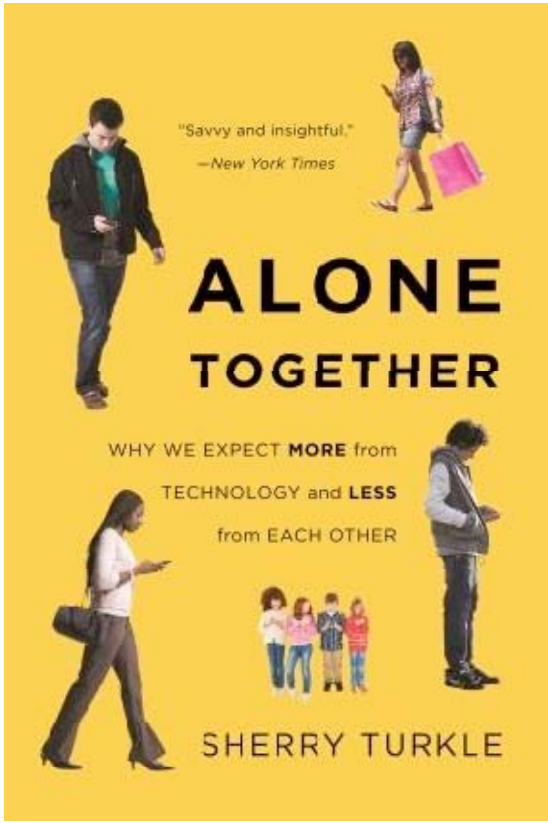
- *"The way in which we strive for society's respect and approval has drastically changed over the centuries"*
- Humans, Families and Society have changed from static to more dynamic
- *"Our human need for respect and recognition has thus remained, while attaining this goal has become all more difficult"*




**Brice Le Blévennec, Emakina**

# Clash of Generations

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- Technology is seen as efficient solution in various fields
  - "Technologies for healthy aging" or "Ambient assisted living technologies" are good examples of fields where good technological solutions might not be adapted due to the clash of generations
- Physiological and esteem needs: "Capacity to handle it myself approach", "Technologies make people appear helpless and challenges their self-image",
- Security and belonging: "Little concern for safety but seek out human contact", "Whose need we are looking at ?"
- "Many existing technologies are poorly matched to the real needs of prospective users"

**Thielke S. et al.**

# Change of the habits

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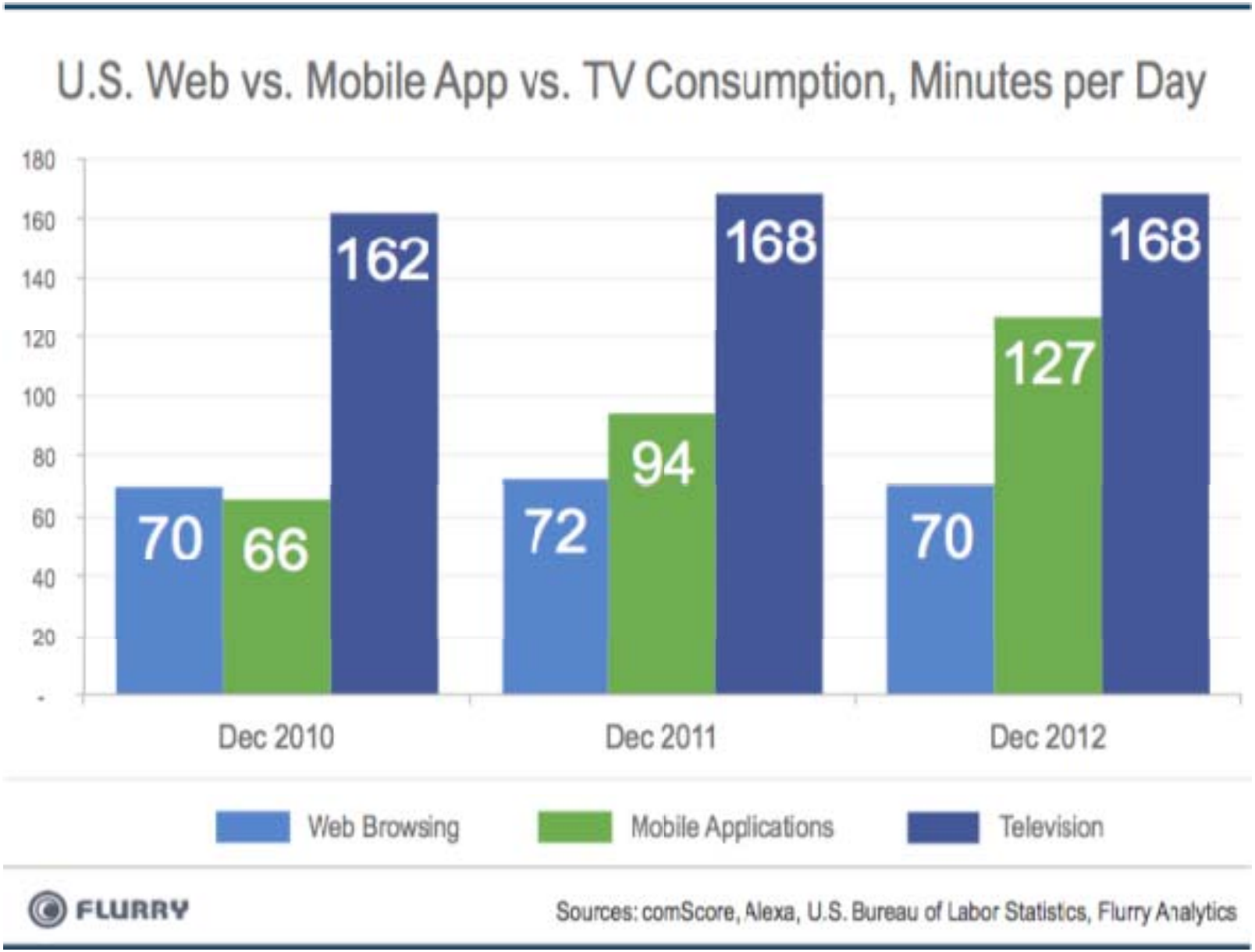


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# Mobile takes over

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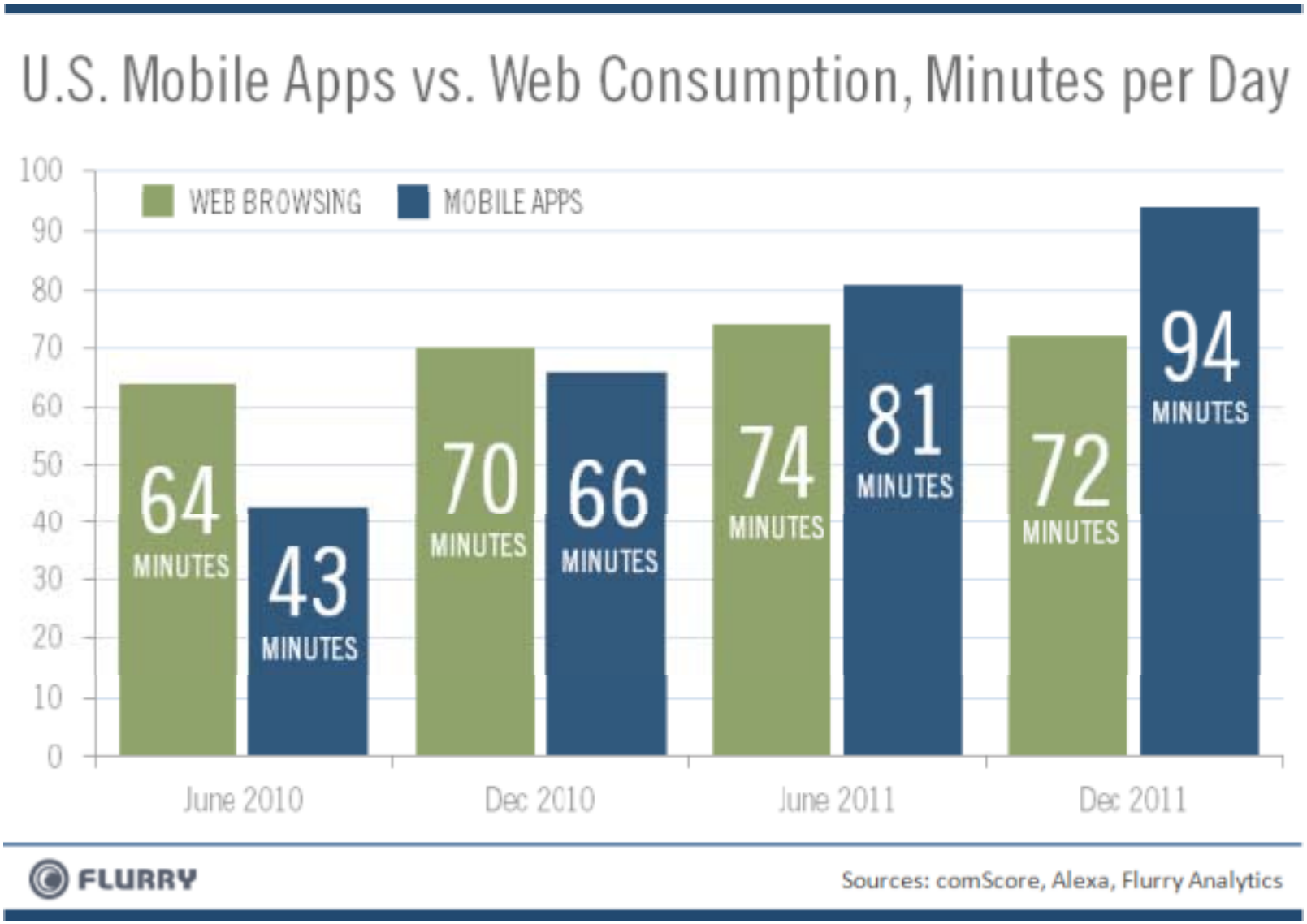

# Rise of the apps

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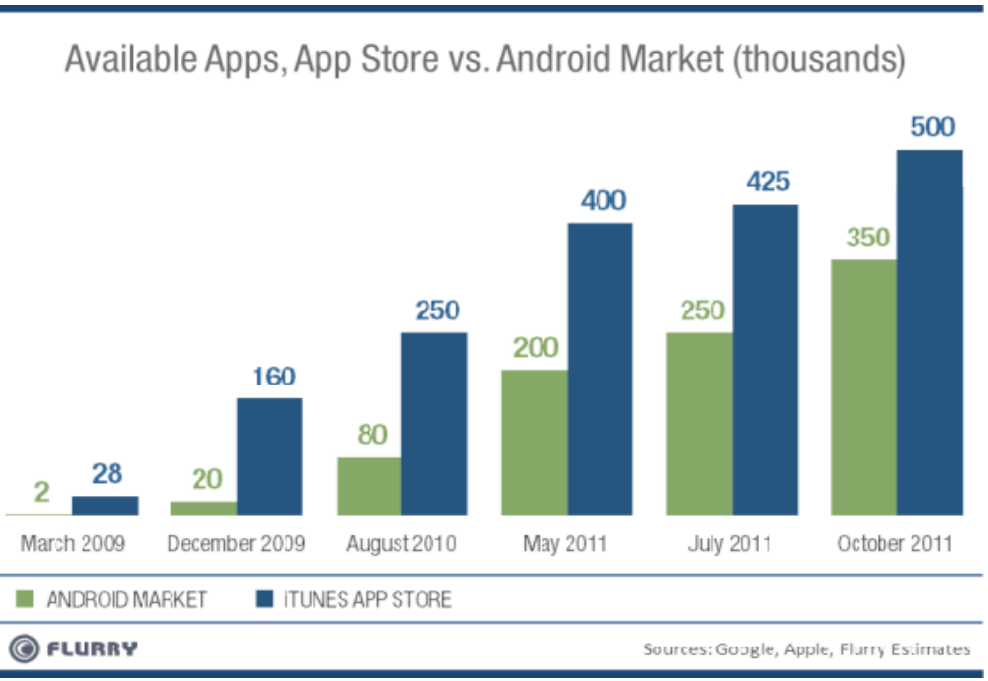
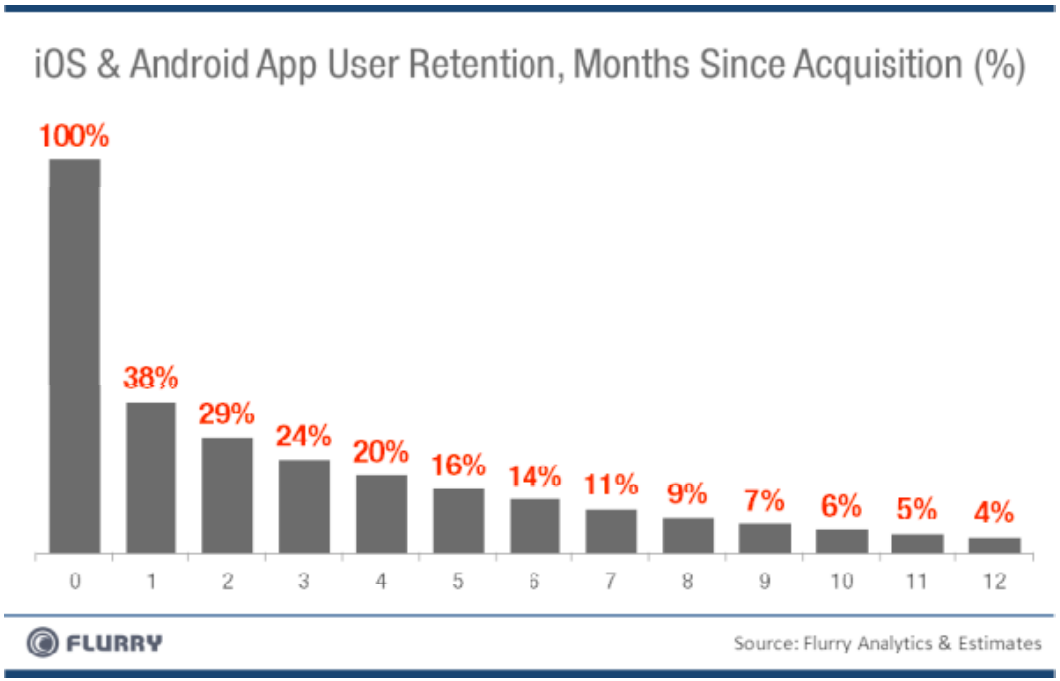
- Ordinary people consume more and more mobile services and applications
  - Number of available applications has exploded
  - Users try several applications and change then frequently

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# How do we use our time

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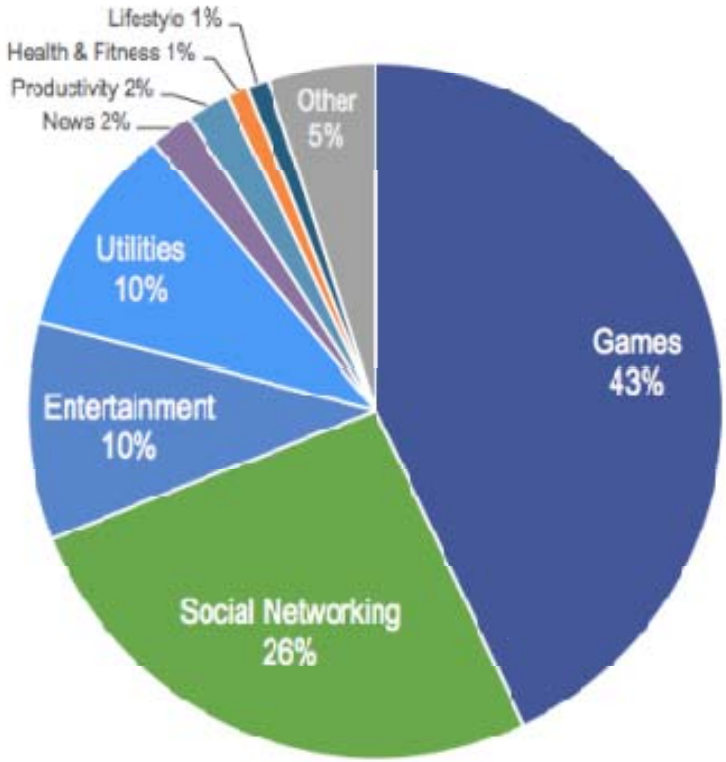
## Loyalty by Application Category


## WW iOS & Android Smart Device Time Spent per A




FLURRY

Source: Flu

**Flurry, Keynote**

# Real needs vs. usage

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**Kukka et a**

- PanOulu experiments for various years reveal the difference what users think they need and what the actually use

| vice | Details | Card sorting | | Actual hotspot usag | |
|---|---|---|---|---|---|
| | | Avg. | Score (%) | Avg. | Score (% |
| ps | Where places are and what's near me | 10.7 | 100 | 122 | 86 |
| nsport | Public transportation schedules, location of transports etc. | 10.7 | 100 | 6 | 4 |
| nts | What's happening today/tomorrow/next week | 9.3 | 87 | 15 | 10 |
| d | Restaurant menus, happy hours etc. | 8.8 | 82 | 9 | 6 |
| | General information related to opening hours, local history, healthcare etc. | 7.2 | 67 | n/a | n/a |
| ather | Weather information | 7.2 | 67 | n/a | n/a |
| ffic | Free parking spaces, construction sites, traffic jams etc. | 6.8 | 64 | n/a | n/a |
| | Offers from stores, where to buy etc. | 6.7 | 63 | 6 | 4 |
| ws | News from national and international sources | 6.6 | 62 | 142 | 100 |
| dia | Images, video, live streaming etc. | 4.7 | 44 | 82 | 57 |
| oads | Possibility to contribute own content | 4 | 37 | 45 | 32 |
| nicipal | Information about municipal decisions, council meetings etc. | 3.7 | 35 | 5 | 3 |
| | Games, quizzes, and fun | 3.3 | 31 | 139 | 98 |
| vey | Questionnaires regarding the hotspots | n/a | n/a | 100 | 70 |

# Rising apps

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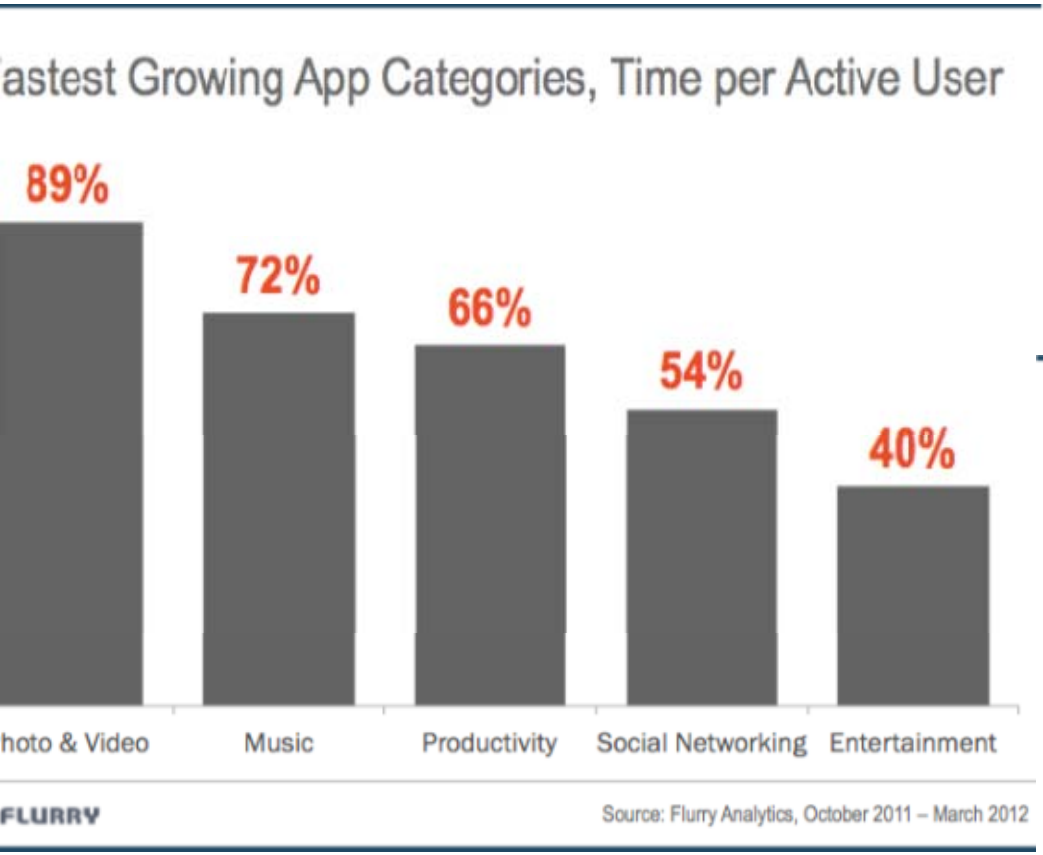


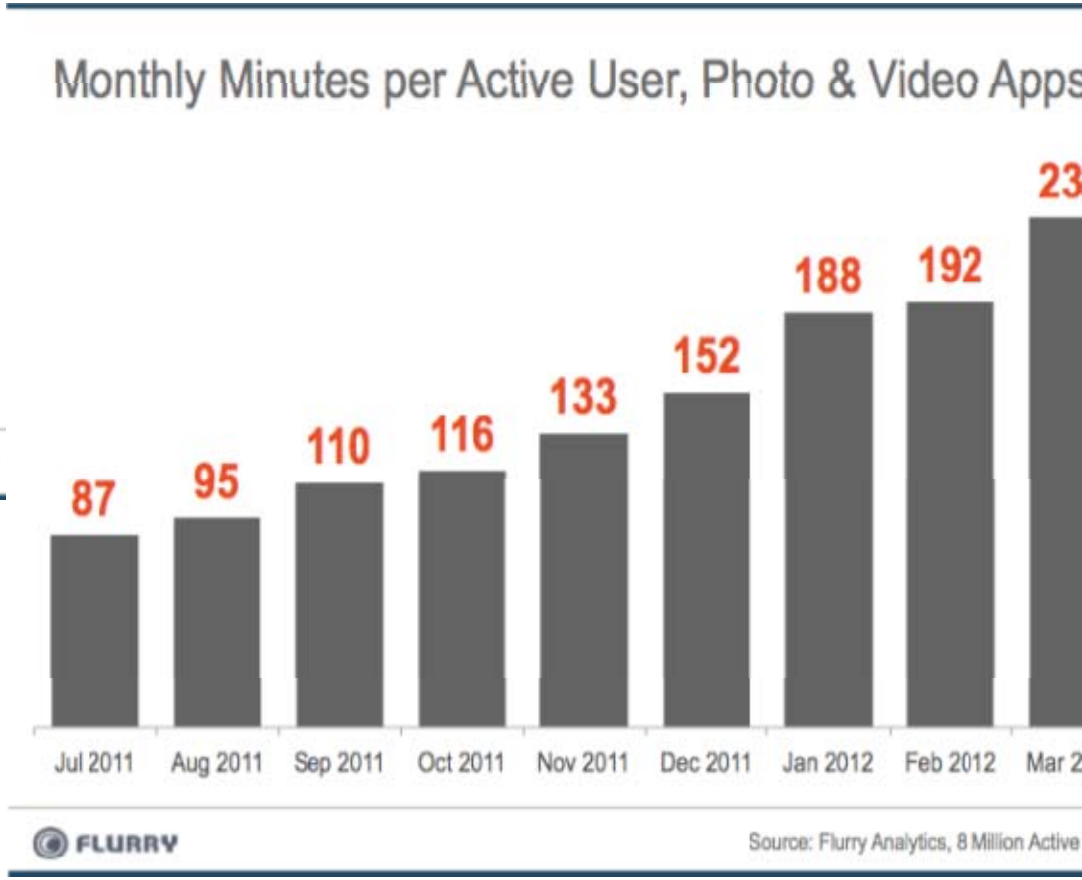


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# Maslow and services

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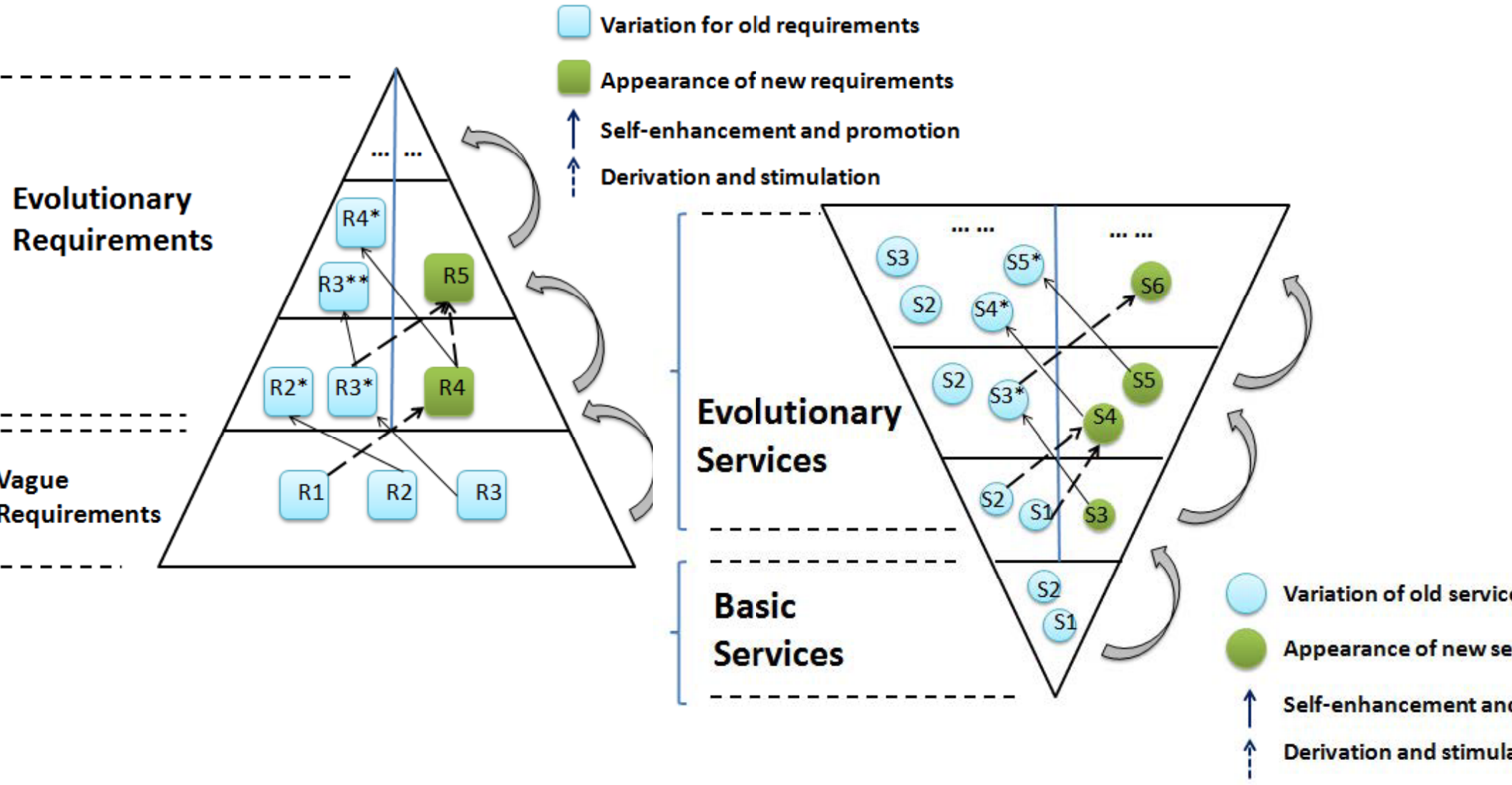


Wang J. et al

# UX is all to the users

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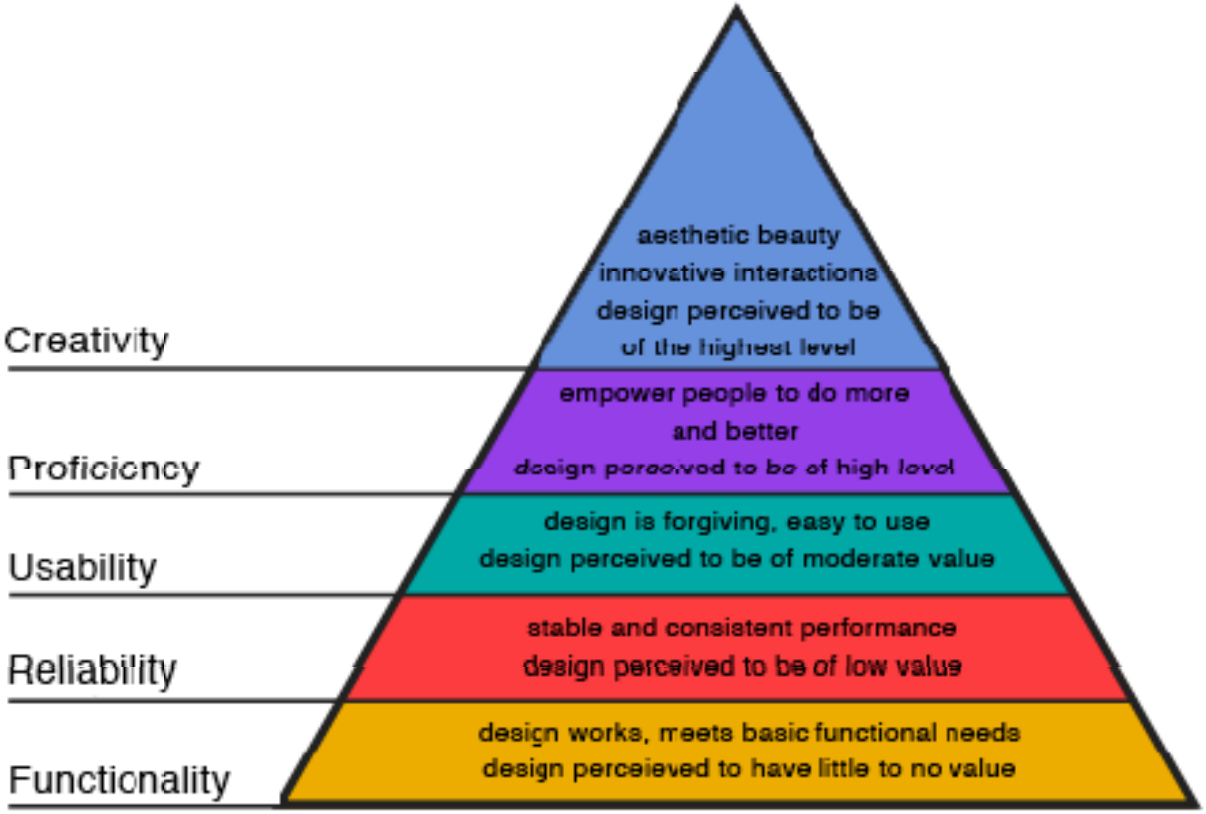
"The idea of a design hierarchy of needs rests on the assumption that in order to be successful, a design must meet basic needs before it can satisfy higher-level needs. Before a design can "Wow" us, it must work as intended. "




Design Hierarchy of Needs

**Smashing Magazine**

# What makes the difference ?

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- Various elements affecting to the user experience (design)
- Mobile ≠ Web
- Should take mobile characteristics into account
- Challenges for the developers and developing tools


**Smashing Magazine**

# Cyber foraging

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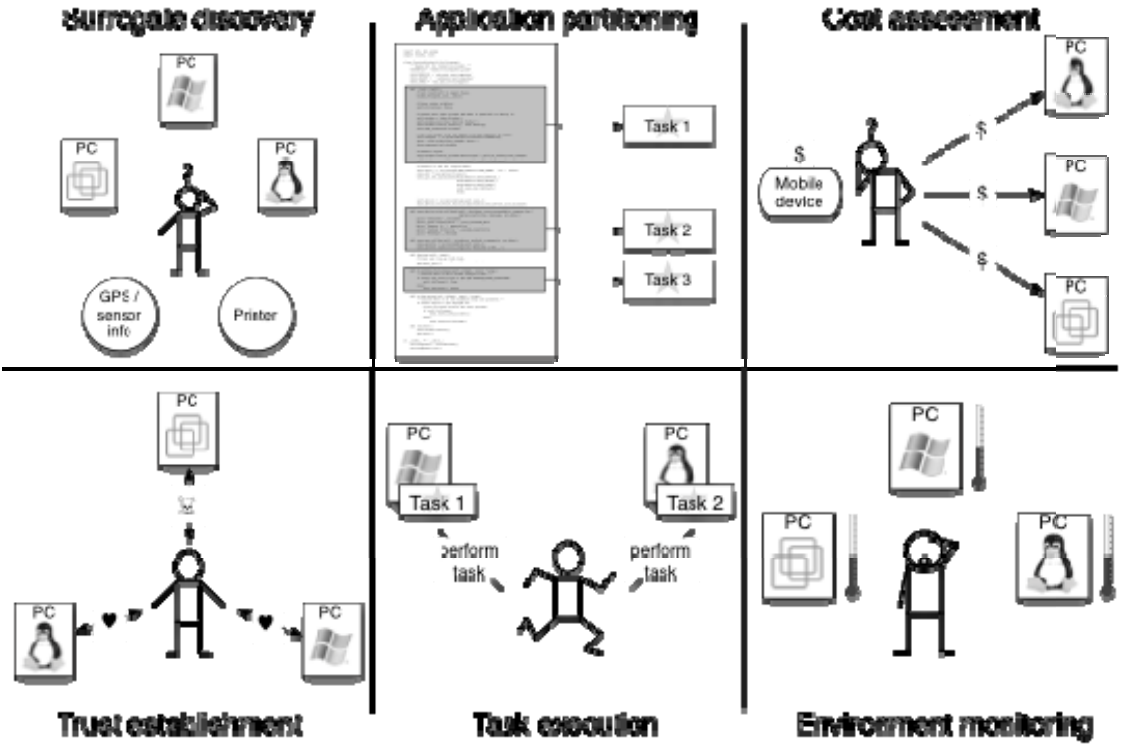
- small mobile devices offloading some of their resource intensive work to stronger computers (surrogates) in the local network environment
  - Resources: CPU power, “energy”, network connectivity, storage capacity, external displays, printers etc.




CRYPTING RESULTS - GALAXY TAB

| | Runtime | mAh | mAh/s |
|---|---|---|---|
| Local | 654.07 | 73.00 | 0.1116 |
| Local - Wifi | 670.78 | 73.80 | 0.1100 |
| Scavenge | 69.11 | 12.00 | 0.1736 |
| Change | 10.57% | 16.44% | 155.57% |

# Transferring user requirements

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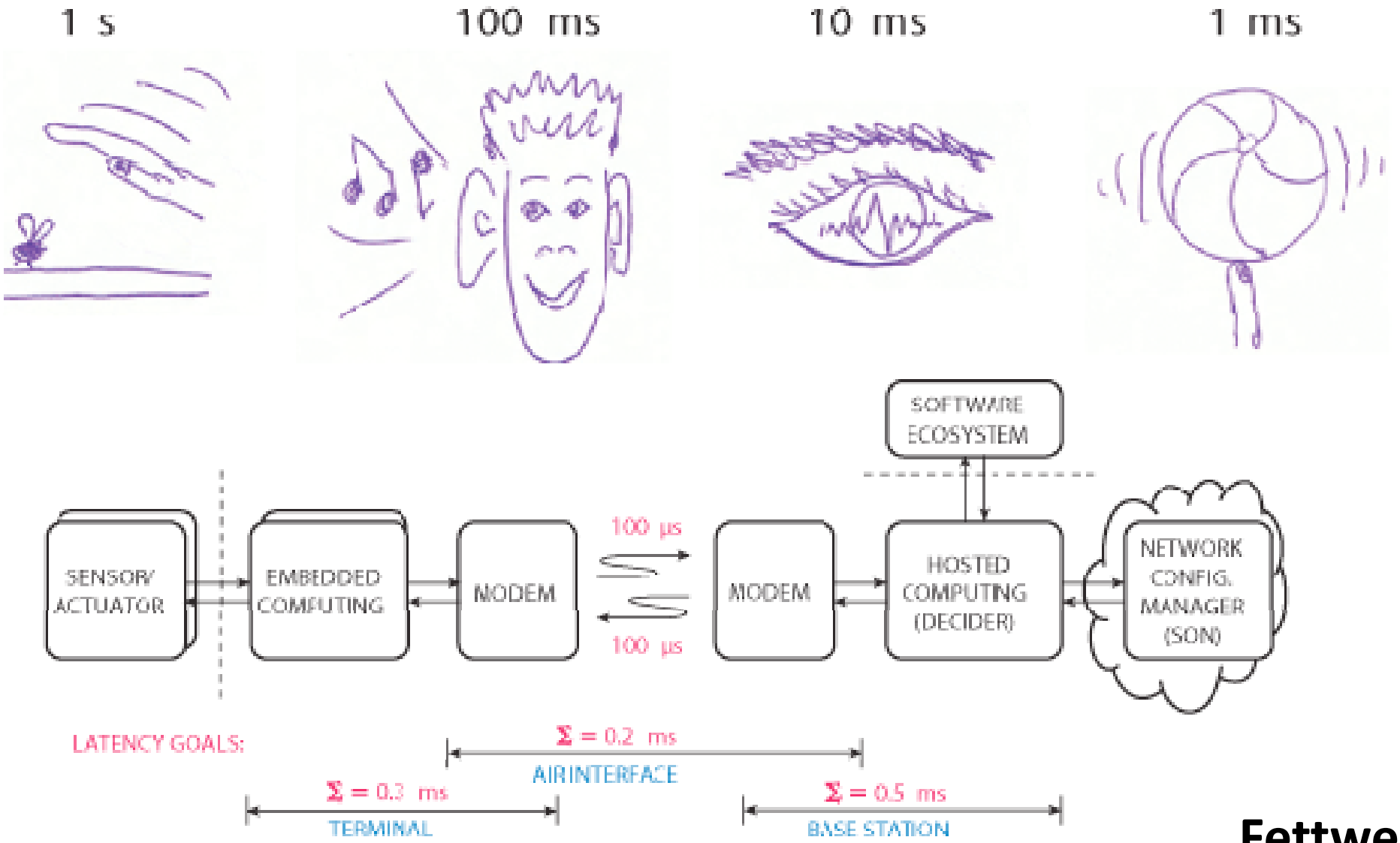


Fettweis G.

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# WWRF Activities

**WGA – User Needs & Requirements in Wireless World**

**WGB – Services, Devices and Service Architectures**

# WGA Objectives

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- WGA is focused on discovering and promoting research areas that strive to understand the **users' needs** for and **requirements** to wireless future internet systems; how the users are **driving** the creation and design of new, emerging services in a **secure** environment and how users will **interact** with devices, systems and applications in the Wireless World. Based on an understanding of the user requirements and the user interaction with devices, systems and applications, WGA investigates and studies the elements of viable business models under different **socio-economic conditions**.

# WGA Challenges

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- **Translating user experience requirements**
  - integration between user requirements and technology advances
- **Context security**
  - authenticity and identity on the move
- **User experience and values**
  - viable business models
- **User requirements and geographical context**
  - Impact of socio-cultural sett**ings**
- **User Scenarios for a Worldwide Wireless Future**

# WGA Working subjects

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- Methods, processes, best practices for user-centered research and design
- User scenario creation and analysis
- The needs of users, operators, service providers for secure and trustworthy wireless systems
- Identification of future services and applications based on user experiences
- User interaction technologies
- User Centric Identity Management Systems
- Spectrum requirements needed to serve user (e.g., no home/ work distinction)
- Geographical or socio-economic contexts
- Business models

# WWRF Vision 2020

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**7 trillion wireless devices serving 7 billion people by 2020**

- All people will be served with wireless devices
- Affordable to purchase and operate
- Calm computing: Technology invisible to users
- Machine to machine communications
- All devices are part of the (mobile) Internet

# WGB – Challenges

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- **Emphasize services and not just devices**
  - Devices are going to be (very) cheap and various ecosystems will evolve; BUT customers will use services

    => All people will be provided with services through wireless devices

- **Ease the use of services and devices**
  - Personalization and Adaptation needs to be taken into account

    => Key-point is the User experience not the (in-)visibility of technology

- **Provide needed services at the right time & place**
  - Emphasize roaming & service availability instead of connectivity
  - User experience may sometimes work without connections

    => All Users are able to take part in the (mobile) Internet by services

# WGB – Impact Areas

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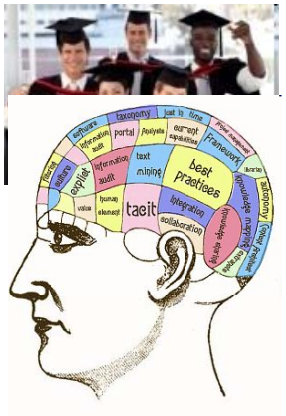
- **What is already clear**
  - The (mobile) Internet should/will not be a network of sites
  - The Future Internet starts as a web of information

- **WGB paves the way to information usage**

Source: Dreamworks Pictures, 2002

Easy information navigation

Turning information into knowledge




Knowledge Management

Making Decisions

Starting Actions

# WGB - Overall Vision

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**An ambient life style where**

- seven trillion devices running services, that are

- **Easy to create →**
  - Intuitive Tools for Service Creation
  - Graphical Service Composition

- **Easy to share →**
  - Generalised client-server / P2P architecture
  - Service deployment in just a few clicks
  - Semantic based publishing

- **Easy to use →**
  - Semantic Service discovery
  - Interoperability, composability of services
  - Excellent User Experience

# WGB - Overall Vision

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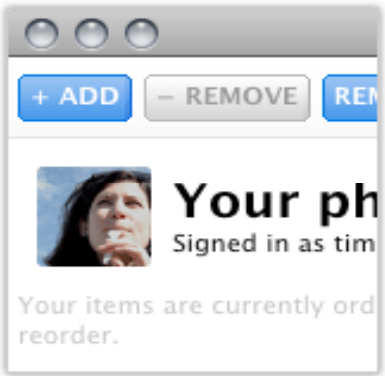
**Service Creation should be done by everybody**

- Like uploading photos to Flickr®



### Browser Upload

Flickr's Web Uploader is the easiest way to get your photos onto Flickr.




### Desktop App

Desktop Uploadr lets you easily manage uploads from your desktop. Drag and drop photos to add tags, descriptions and titles before uploading to Flickr.

# WGB - Overall Vision

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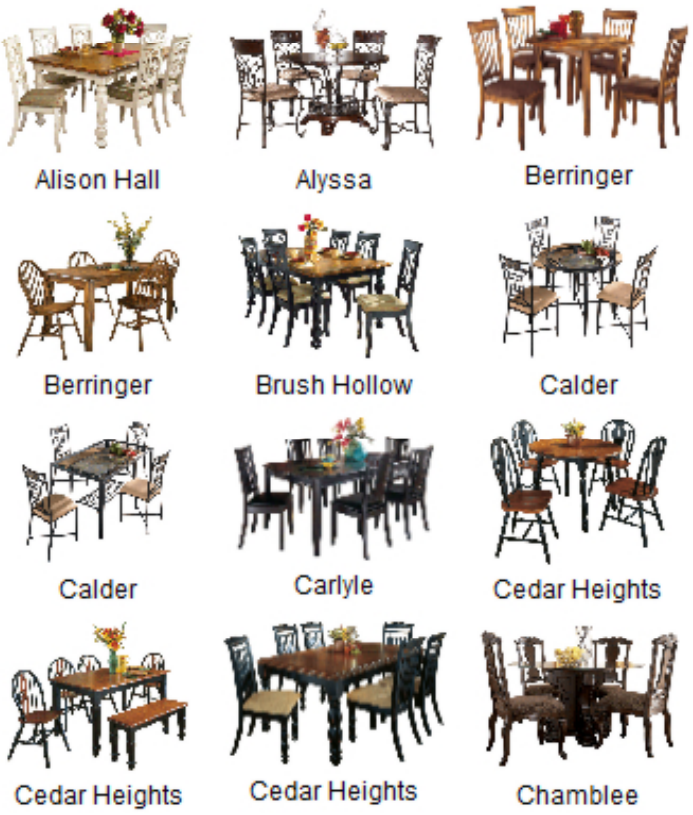
**Enrich Service Landscape**

- Like choosing tables/chairs from stores


Towards a multitude of option



# WGB - Overall Vision

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**Service experience is of upmost importance**

- Should be far beyond “touching screens”

Enhance user experience

**Better look for EnE (Efficiency & Experience) vs. LnG (Layers & Generations)**

# Summary

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- Users and societies are in middle of fast changes
- Need to understand the nature of these changes
- Changes create needs
- Needs are tackled in various levels; applications, devices, networks, radio
- WWRF is the right place to work on the future solutions