



Nokia Research Center

Extended Home Team

Trends driving our work

- Branded, vertical home experiences appearing vs. "standard"-based solutions
- Fixed Mobile convergence: more operators trying to get a foothold in user homes
- Gigabits to the home becoming normal, 802.11n meaning 200Mbps @home over WLAN
- Radio enabled devices are getting much smaller: 5sq mm by 2014?
- Sensor networks becoming widespread with little or no power consumption: e.g. zWave can drive home automation business.
- Connectivity reach extending, with more and more Internet connected devices: WLAN widespread, e.g. appearing in TVs, consoles, many devices @ CES
- Broadcasting becoming personalized: Time-shifting already changing viewing patterns & more localized broadcasting.
- Outsourcing of home technology management: Network storage as an Internet service already available, and automatic backup solutions coming.
- Competition to the PC as the center of home technology: Gateways, Set-top-boxes, Personal Video Recorders, mobiles all striving to replace it
- Aging population needing simpler technology : more ambient Internet devices appearing
- Display costs continuing to fall, display sizes rising
- HD ready sales high now, real broadcasts in 2010?
- Touch based interaction goes mainstream: Near Field Communication (NFC) now well standardized, mature
- More user driven development trend extends also to home
- Environmental issues increasing in importance: e.g. driving to work vs. tele-working
- Telecommuting from homes becomes more prevalent
- PC/Media-center self-evident part of homes, like fridge for which a place is reserved in home furnishing.
- Security and privacy of home networks increasing in importance as more content and devices appear on the network, more biometrics @ home.
- Home automation sector moving away from non - IP and becoming less vertical in nature: ready for disruption..

Our **Vision** for the **Digital Home**

Home – Away from Home

Smart Home Control

Content & Experience Sharing @ Home



Home away from home

- **TECHNOLOGY DESCRIPTION**

Secure tunneling techniques for reaching a home network while mobile. Seamless user experience of connection usage and content caching techniques required to optimize user experience. Best approaches for dealing with NAT traversal and Firewall. Configuration of the home gateway and mobile devices to enable remote access must be simple and standards are being developed.

- **DRIVERS**

Content size increasing (HD to increase it further), more and more content on the home PC. User trust concerns with external hosting services as an alternative to the home PC. 3rd party approaches are only a temporary solution. VDSL and later Fiber expected to deliver 100Mbps broadband to homes.

- **USE CASES**

- At a friend's house, stream a movie from your home PC to their TV
- While @work, check if lights were left on at home
- On a business trip easily post your pictures back to the home network e.g. to a digital image frame.

- **IMPACT**

Make it possible for users to set up and use remote access without needing help from proxy internet services

- **Customer Benefit**

- The UE of home network will stay the same even though the device is away from home
- Simple and secure way to monitor what is going on at home
- Strong security of home connection without the need to remember passwords etc.



Best of breed Smart Home Control

• TECHNOLOGY DESCRIPTION

The means to bring out the best of the home network : involves enabling users to visualize their homes, understand how to create customized personal activities @home : development toward multimodal UI : home security configuration, context awareness, autonomic middleware

• DRIVERS

More and more networked devices being sold for home use – printers, NAS, game consoles. Market for non multimedia devices e.g. temperature control expected to grow too. Too many remote controls, users confused. Some companies already offering. Display costs plummeting -> where to play the content?

• USE CASES

- New interfaces for control via voice, cameras, 3D view of the home, digital inventory of the home
- Home that reacts when the owner walks in the door, plays favorite music on home hi-fi, redirects calls to home phone
- More context aware home becomes possible, e.g. Follow me video, “night mode” for home, learning home
- “Control” extending to common family items like gallery and calendar

• IMPACT

- Raising the importance of Nokia devices at home, value of devices to users increases @home : Nokia internet services more useful.
- New form factors for dedicated Nokia controlling devices @ home.

• Customer Benefit

The home network is much easier to manage. People know what it is capable of and even learn how to customize it to do what they want easily. They understand how to use the home network to get more value from their Nokia device too – e.g. play music there, take calls on home hi-fi. When things go wrong, they can fix them easily using the Nokia UI. They can also save power usage of the home network by using this UI.



Internet @home :

Sharing content and experiences

- **TECHNOLOGY DESCRIPTION**

Sharing will evolve from one way publishing-consuming into interactive participation and a meeting point for social activities. Intuitive user interfaces for sharing of digital content, easy SDKs. HD quality for video presence – just like being there. Family DRM with fair rules for sharing. Calendar sharing for home scheduling. Interplay between home media centers and internet storages.

- **DRIVERS**

Increasing generation of content and storage to home and to internet. HD TV sales boom + new WLAN standards bringing higher throughput . Social networking sites driving content sharing from mobile devices.

- **USE CASES**

- Sharing with people via Contacts book – intelligence takes care of securing this, directing them to the right place to get the content
- Easily sharing music and files as part of HD video calling
- Families keeping track of each others schedules, what is happening

- **IMPACT**

- Nokia devices are the preferred method of generating, sharing content, and interaction with community groups
- Many everyday social and trading activities start from the mobile devices
- Showing family albums is finally fun...
- Consumers are no longer worried about investing in protected content – fair DRM

- **Customer Benefit**

User created content and experience sharing is made easy, engaging family/friends/community members to invest time into it. Inspire them to further contribute and participate in social activities. Controlled sharing of commercial content is seen as a fair mechanism by end users.



- <http://research.nokia.com/extendedhome/>