

“Sven and the Media Portal”

A Nomadic Use Case for the Extended Home

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Abstract— The Networked and Electronic Media Technology Platform (NEM) [5] states that users will consume an “innovative mix of various media forms, delivered seamlessly over technologically transparent networks, to improve the quality, enjoyment and value of life. [6] visualizes a future use case and some of the challenges that need to be addressed before the NEM vision becomes reality.

Index Terms—Residential Networks, Home appliances, NEM, Resource Discovery, UPnP, Networked AV

I. INTRODUCTION

A. Background

What will Networked and Electronic Media Technology Platform (NEM) [5], Universal Plug & Play (UPnP) and Digital Living Network Alliance (DLNA) [1-4] contribute to our personal future to “improve the quality, enjoyment and value of life. [6]”?

In this article we take a “typical” user of the future called “Sven” who has the simple desire to listen to some music. We follow Sven through his interaction with his “Personal Media Portal” to reach music from wherever he is, from whatever source, and on whatever devices.

B. Sven and the Personal Media Portal

Before we can dive into the scenario we assume that Sven doesn’t care about technology but just about listening to music.



Fig. 1. Introduction to Sven who longs for some music.

He knows that sometimes he is too far away from wireless home networks to access high-resolution music videos, but fortunately he can still listen to music using his phone.

His phone is his most important personal device. He knows that it carries information about his preferences, and that it does allow him to get in touch with services, wherever he is.

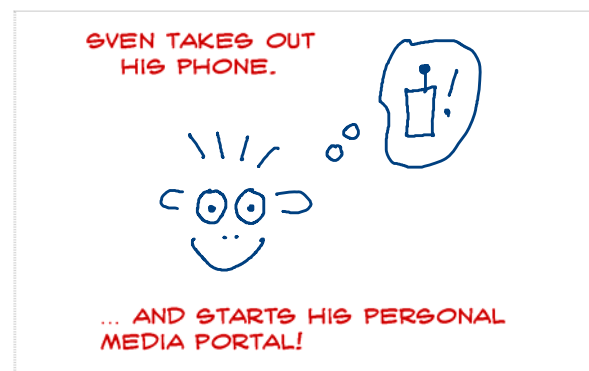


Fig. 2. Introduction to Sven who longs for some music.

It is no wonder that the first thing Sven does, is to take out his trusted, multimedia enabled phone. He knows that by starting his “personal multimedia portal” he can access to all types of media wherever he is. Sven selects Music.

Technical Aspects:

a) User Interaction

The application should allow for convenient access to all types of media

b) Implementation

The application can be network based through a browser as used by Orb.com [16] or client based, e.g., like Windows Mobile Media Player [17]



Fig. 3. Browser based implementation of a personal media portal [17].

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C. Music from Where?

Sven has access to lots of music. Some music files are on his phone, his home music server, his friends' phones or friends' servers, and some is online as internet radio or music videos. Sven selects IP TV as he likes to see his favorite artist's last video very much.

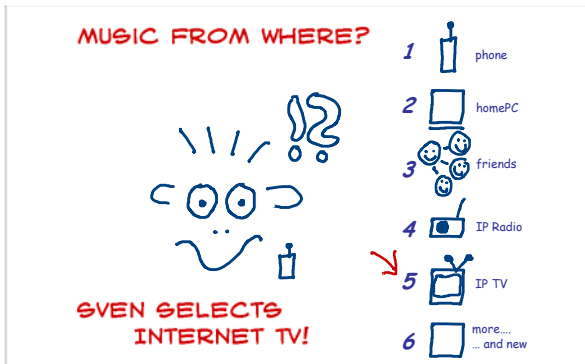


Fig. 4. Sven selects music wherever it comes from.

Sven could just as well have chosen music (at lower quality) from an online music store, or a networked music storage service such as mp3tunes [18].

Some music services come to him only when he is close to an information beacon. That happens sometimes in public areas when large poster ads are enhanced with sound files. A small indicator on his phones tells him that new services are discoverable nearby. Most of the time he ignores it, but some times, in front of a poster of Mariah Carry's latest album he can't resist.



Fig. 5. Access music from anywhere through networked storage [18].

Technical Aspects

a) User Interaction / Location Independence

All services are presented in a consistent manner, independent of their location (phone, local, home, remote).

b) Sharing

Friends share items, e.g., CDs and books. In the same way it should be possible to temporally allow friends access to media wherever it is (on my phone, my network storage, home server, ...). DRM (Digital Rights Management) will make sharing of music more difficult as licenses may be bound to a certain device.

c) Security, privacy and trust:

There is a mutual interest of the users, their friends, and involved businesses to create a trustful environment for services. User privacy and security is (as always!) a key component of all solutions.

d) Service Discovery:

Easy integration of new media sources must be simple. Some of the services might be pre-configured, others will come via referrals, or advertisements.

e) Flexibility:

Many different solutions will exist in the future, each coming possibly with different media formats, streaming and access protocols, security and DRM features, media control, ... The architecture should allow for plug-ins on the network and terminal sides.

D. Selecting the media item

Sven has a list of favorite online music TV stations. All for free. Today he selects launch.yahoo.com. He doesn't mind the 30 second advertisement for m:i:III [19], as along as the service is for free.



Fig. 6. Sven selects music wherever it comes from

Sven uses different devices to access his media services. Instead of his phone, it could as well have been his home media PC, his XBOX 360, a friend's phone, or his office PC (his employer won't pay their IT providers lots of \$\$\$ per Gbyte to have Sven store music on a company server ...).

Technical Aspects:

a) Device Independence

User should expect to be able to reach their music from wherever they are from whatever device.

b) Automatic Content Adaptation

Many internet services such as orb.com and launch.yahoo.com adapt content to the users bandwidth and device capabilities. Orb.com uses a user's home PC for that to distribute computational load.

c) Single-Sign-On and Simplified Login

Service should offer the possibility to simplify log-in if the user desires it ("remember me on this device"). Entering user-ids and complex passwords on a mobile device is cumbersome, especially if characters in a password are hidden by "*".

d) Latency

Service latency can be quite large not so much due to bandwidth restrictions but by servers handling complex XML based meta data for thousands of items for thousands users.

E. What Output device?

Sven is now ready to listen. His last choice is to use his trusted phone for the music video. He could as well have chosen one of the devices at home, which his phone easily discovers via uPnP [1-4].

Sometimes he browses music on an Interactive Hotel TV system, and uses his phone to listen to it. That saves him the trouble to get angry knocks on his wall when he listens to “Green Day” at an adequate sound level.

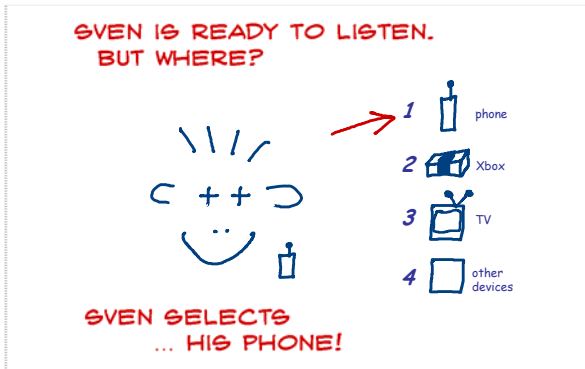


Fig. 7. What output device should be used?

Media can be accessed by any device and played by on any devices as long as they support a common set of protocols that allow control points to discover them.

The Ericsson-HiA ONE project has prototyped different scenarios [20] in which mobile phones act as detectable media servers and renderers. If a friend allows you, you’ll be able to play some of your music on her phone.

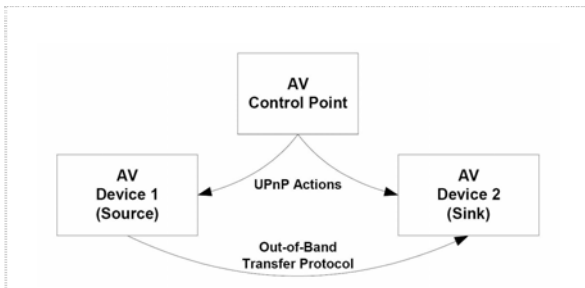


Fig. 8. DLNA/uPnP AV architecture

Technical Aspects:

a) Device Independence / Play-back

A user should be able to choose freely from a list of favorite devices, and a list of newly discovered devices to render media streams.

b) Separation of media server / renderer / control functions

DLNa/uPnP [1-4] have standardized protocols to automatically discover media services and renderers by a uPnP control point (see fig.8).

c) Device Ownership

Users must be able to declare ownership of devices [21] and their services to secure them from un-authorized access. Such ownership will be important to allow controlled remote access for friends or managed services providers.

d) Low power solutions

Wireless devices such as phones need to take care of battery consumption to pro-long operating time. Regularly multicasting service announcements via WiFi

can, e.g., be avoided through service directories and proxies.

e) End-2-End Session Set-up and Addressing

A distributed architecture needs to allow, e.g., to re-establish contact with nodes that were enabled initially through local discovery (such as your friends phone or media server). Such End-2-end session establishment faces many security, naming and addressing challenges (firewalls, multiple NATs, ...).

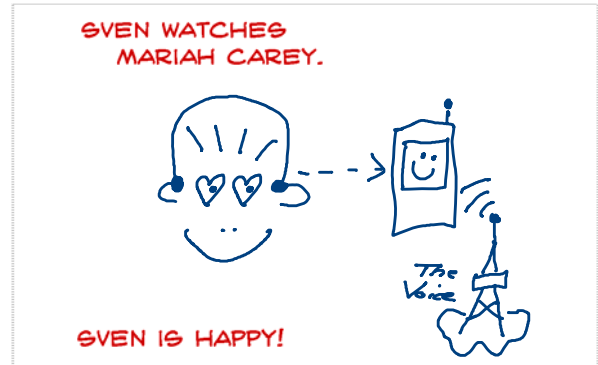


Fig. 9. Finally listening.

F. Summary

The Networked and Electronic Media Technology Platform (NEM) [5] claimed that users will consume an “innovative mix of various media forms, delivered seamlessly over technologically transparent networks, to improve the quality, enjoyment and value of life. [6]”

In this article we tried to illustrate how such a vision could work independent of where users are, what type of media is consumed, where the services are provided, what device they are using to control and rendering the media.

However, we still have a long way to go, before all the necessary standards and platforms are in place.

Users are not ignorant of circumstances and context. They will know that sometimes they have to pay to access their media, and that sometimes they only can listen to music and not see a music video.

“Intelligence” in “automatically adaptive” applications can be driven very far (... has Microsoft Powerpoint ever “autofit” font-sizes for you even if you don’t want it? ...). We must give users a notion of being in control of what is happening.

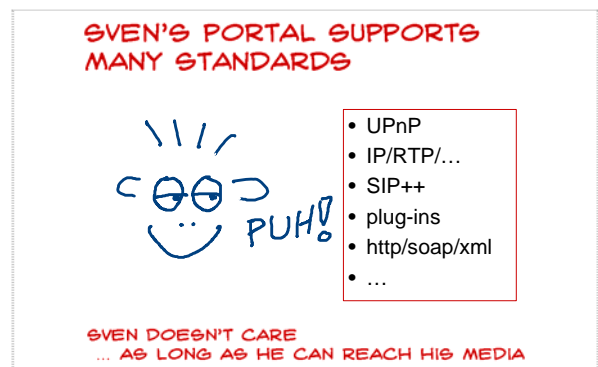


Fig. 10. Technology is better hidden from users.

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