OSGi Platform for UPnP Audiovisual Service Delivery

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Fifth International Workshop on Intelligent Solutions in Embedded Systems

WISES'07

University Carlos III of Madrid, Madrid, June 21th – 22nd, 2007

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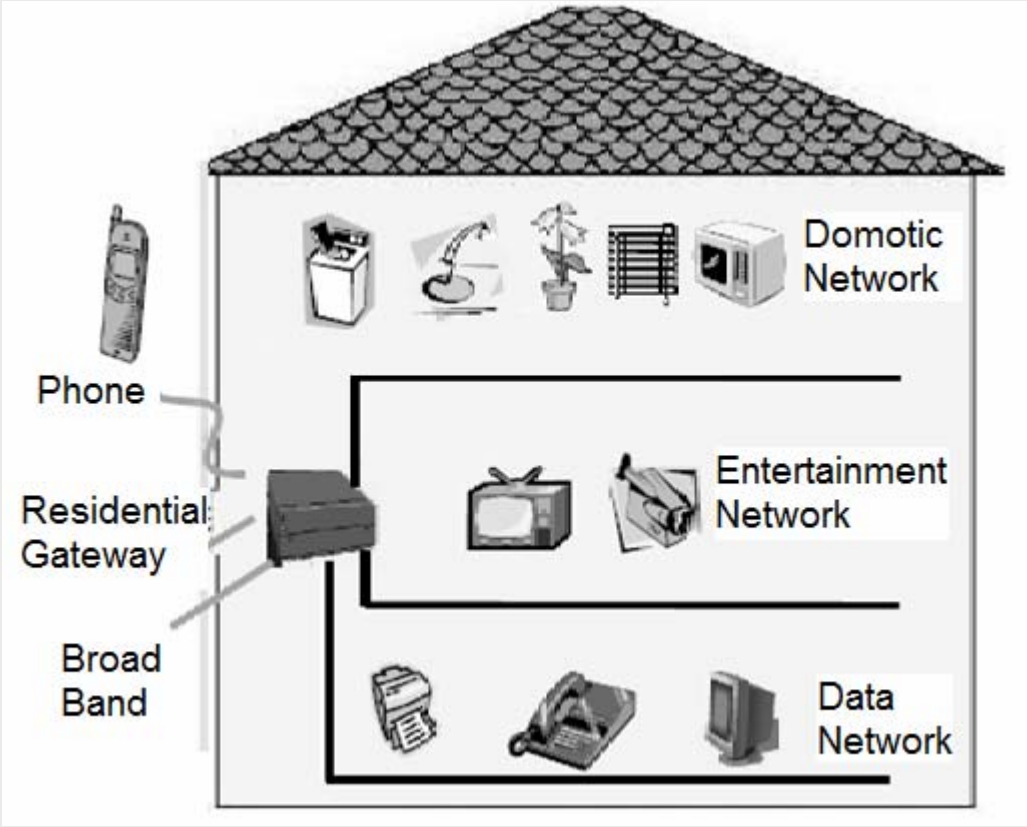
Motivation

- Several content providers offer multimedia services used by clients in multimedia devices
- Current situation: Client's discovery and access to services requires several configurations
- Number of multimedia services very high
- Dynamic networks

Automatic Configurations without human intervention!



Objectives

►We want a Service Platform typically located in the Residential Gateway that allows:

- Efficient management of Multimedia Services for Content Provider

-Discovery and access to multimedia devices / services without human intervention to configure it

-Transparent Discovery of remote services that appear as local services

Proposal of Work

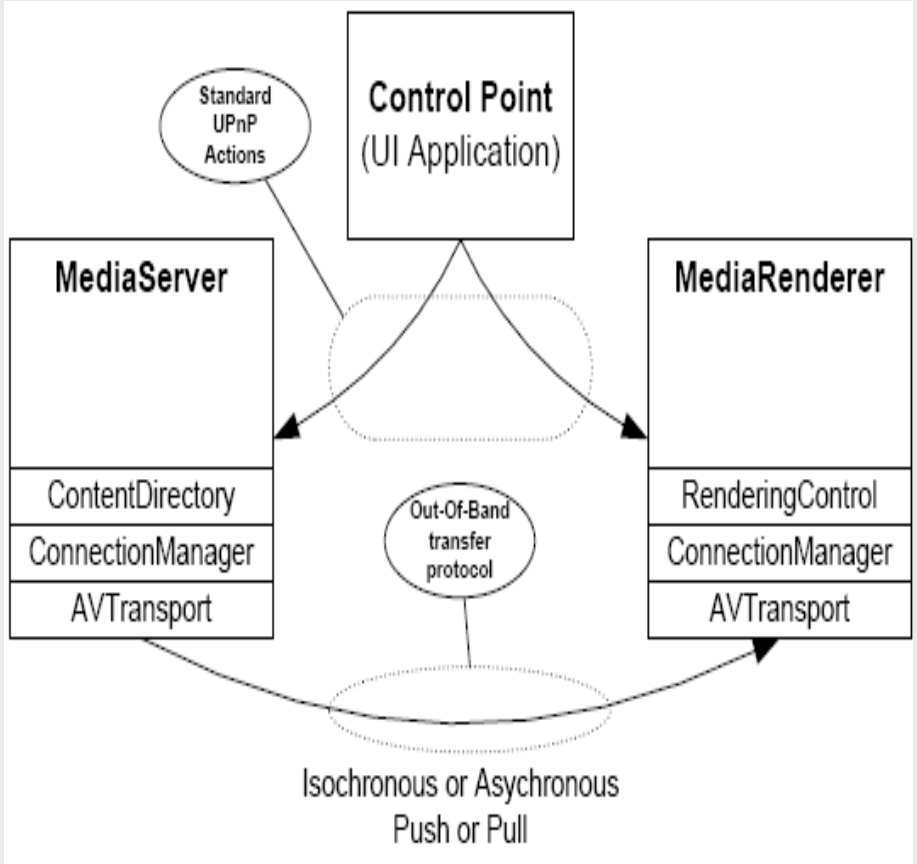
- ►UPnP as standard interface
- ►OSGi framework for dynamic deployment and remote management
- ►Implement a Control Point and a Media Server under the OSGi framework (bundles)
- ►Allow external elements as Media Servers (UPnP Media Server Proxy)

Technologies Overview–UPnP (I)

- UPnP: Universal Plug and Play is a Initiative of Microsoft and developed by UPnP Forum
- Objective: Standardized access and management of devices
- Devices share services without a manual configuration or human intervention
- UPnP Audio Visual (AV) is a standarized UPnP architecture

Technologies Overview–UPnP (II)

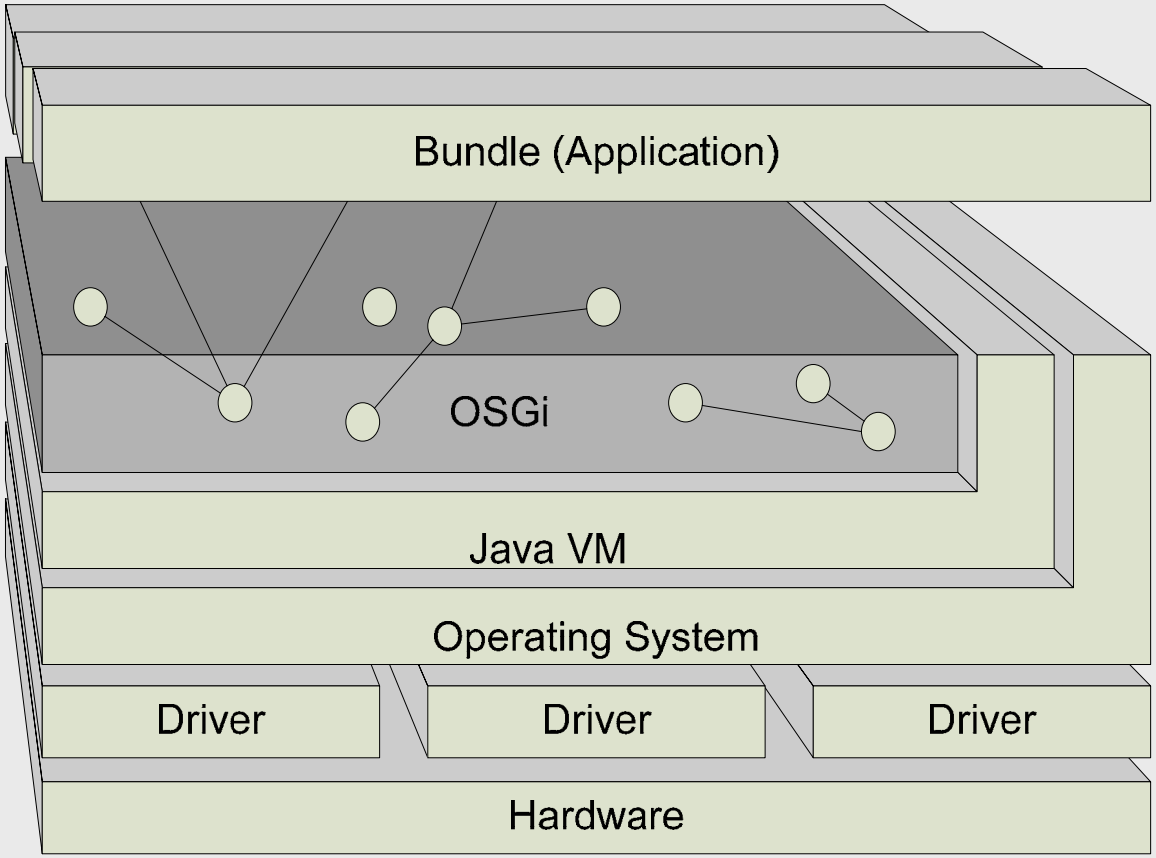
- Two kinds of actors in UPnP AV: Multimedia Devices and Control Points
  - Multimedia Devices:
    - Media Servers: Servers of multimedia content
    - Media Renderers: Multimedia players
  - A Control Point
    - Discovers new devices using the information announced by the devices
    - When a control point joins the community it requests specific devices/services
    - A device could be a control point and a controlled device in the same time



Technologies Overview – OSGi

- OSGi provides a platform to develop applications and services
- OSGi framework allows to install, start, stop, uninstall and dynamical update of the services
- Services are independent of the hardware platform or the operating system (are executed over Java Virtual Machine)
- Packages executable with code are aggregated in modules named bundles
- Bundles communicate between themselves and offer their services to others bundles
- Permits any management protocol

Technologies Overview – OSGi (II)



Related Work: Available UPnP Audiovisual Implementations (I)

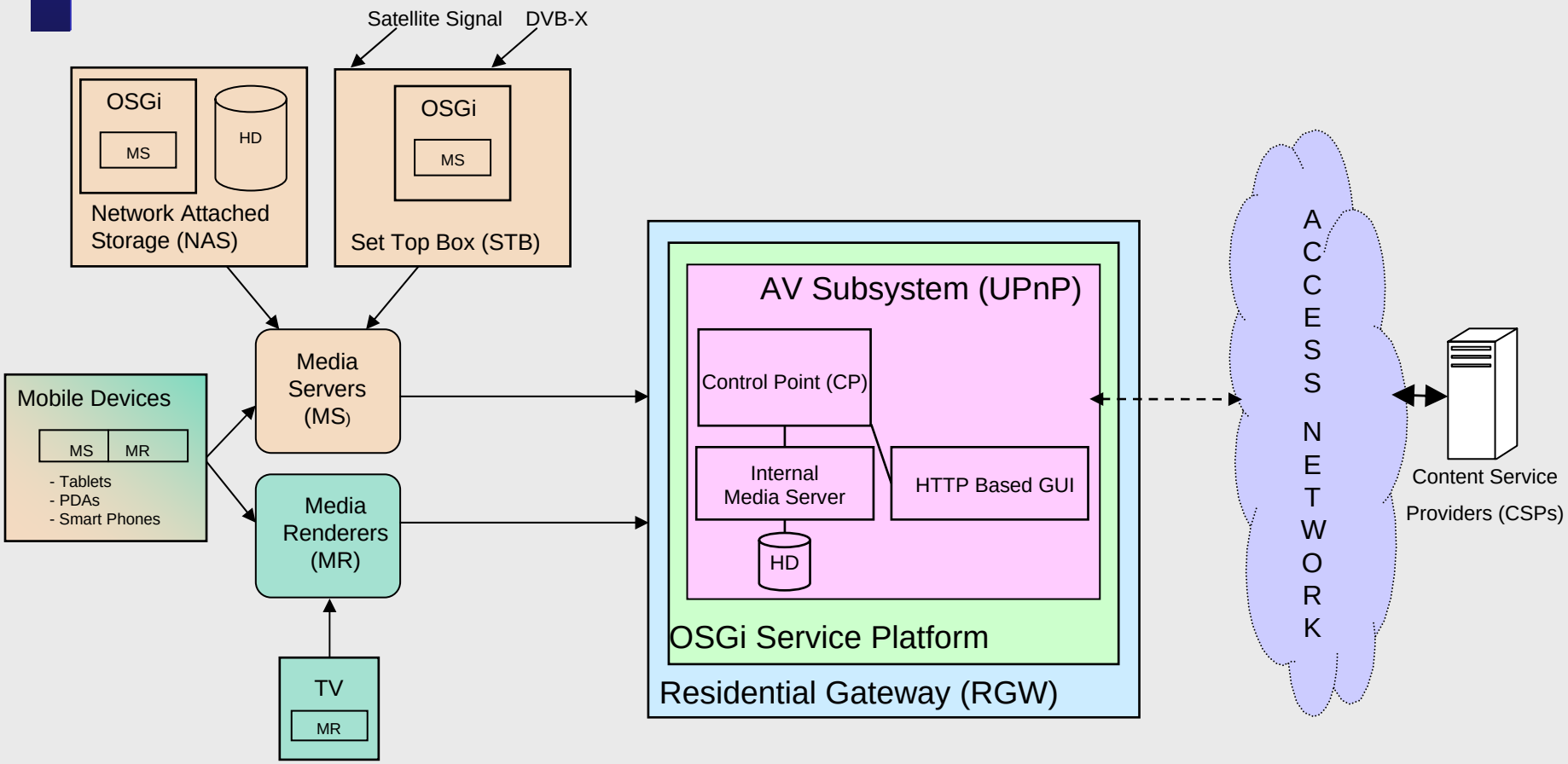
	O.S.	MS	MR	CP	Open Source
MediaGate	W,L	✓			✓
Intel	W	✓	✓	✓	✓
Cidero	W,L			✓	✓
On2Share	W	✓			
MStreamer	L		✓	✓	
PocketPlay	W	✓	✓		
MConnect	W	✓			
MPlayer11	W	✓	✓		
GMRender	L		✓		✓
Xbox 360	.Net	✓	✓	✓	
Nokia N93	Symbian	✓	✓	✓	

- O.S: Operating System (W: windows, L: linux)
- MS: Media Server
- MR: Media Renderer
- CP: Control Point)
- ✓ : Components of that UPnP AV category existing

Related Work: Available UPnP Audiovisual Implementations (II)

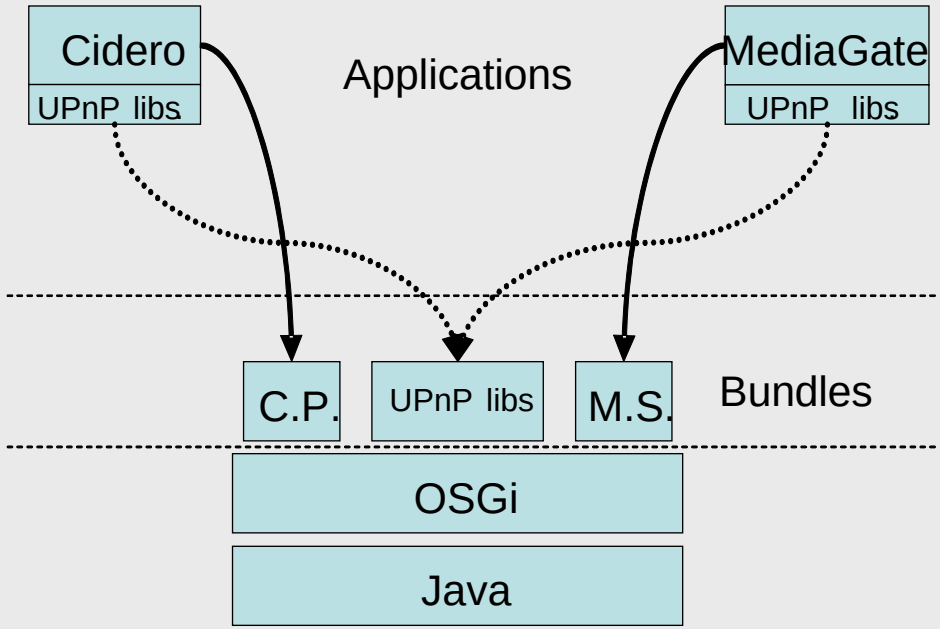
- Devices supporting UPnP protocol have an increasing market share; especially the Audio-Visual (AV) market is growing
- Several incompatibilities between implementations
- No open source implementation of an UPnP AV Media Server or Control Point for the OSGi platform available, and this is we have done in this work

System Architecture



Design and Implementation of Control Point and Media Server (I)

1. Choose components available in Windows and Linux platforms and open source
2. The Control Point of Cidero has been transformed in a Control Point bundle
3. The Media Server CyberMediaGate has been transformed in a Media Server bundle



Design and Implementation of Control Point and Media Server(II)

- Integration of Control Point and Media Server on OSGi Platform is done
- The UPnP applications now can be remotely manage
- The external graphical interface does not have to change, the user could continue to use the applications in the same way
- Separating the presentation logic of the business logic

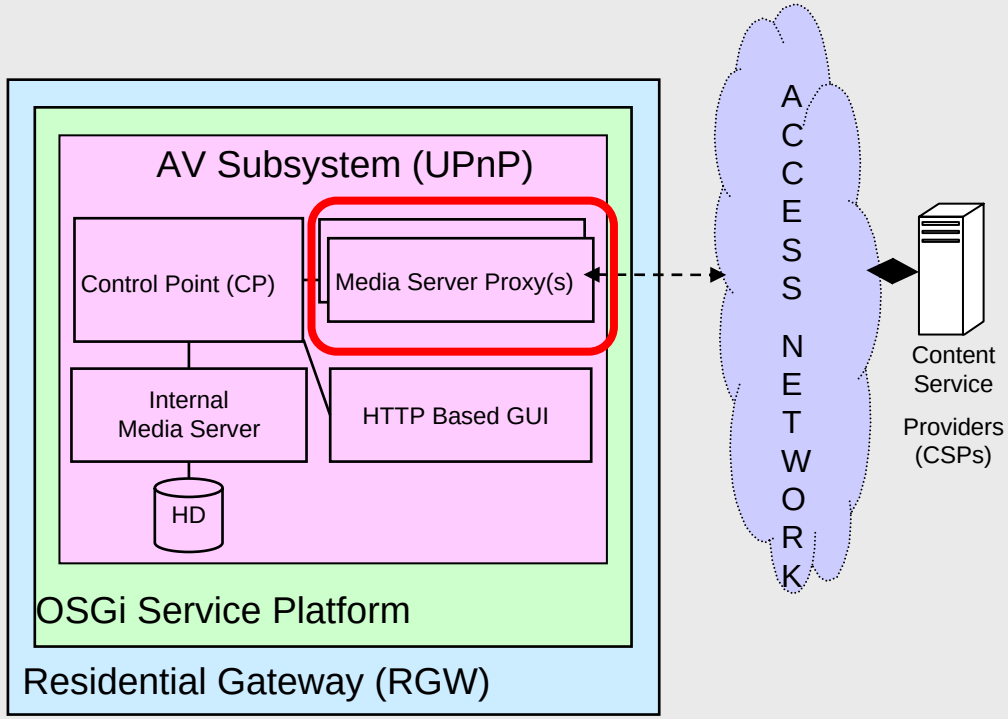
Proxy UPnP Media Server (I)

- The AV UPnP architecture, in the specification of the UPnP Forum, is focused in a local network
  - Discover multimedia devices in local network
  - Transfer multimedia contents in local network
- Goal make remote services available that behave like local UPnP services
- A Proxy Media Server is needed in the Residential Gateway

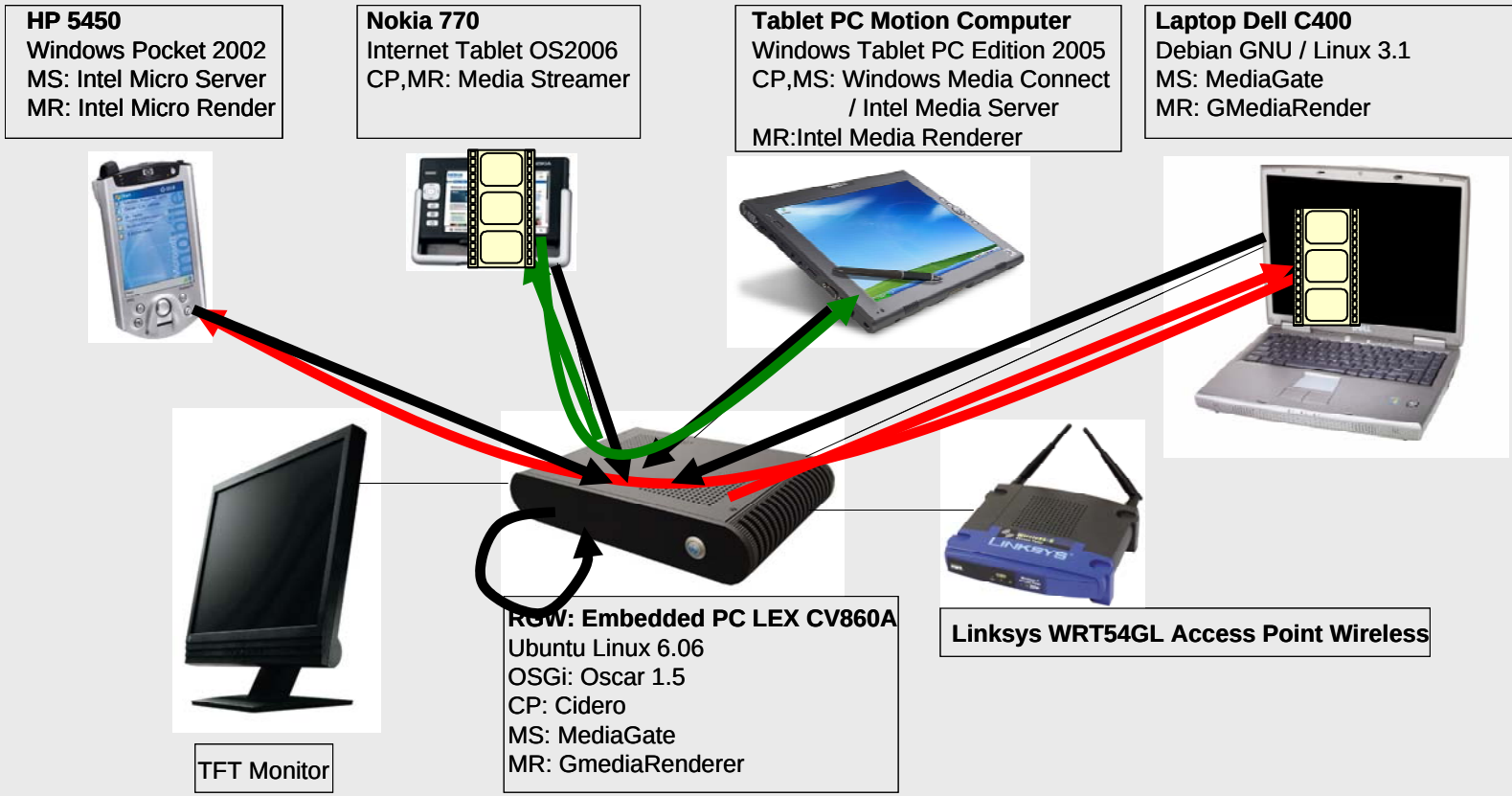
Proxy UPnP Media Server (II)

Residential Gateway with Multimedia Subsystem formed by 3 bundles

- Control Point: Internal Control Point in the Residential Gateway
- Internal Media Server: Media Server with Contents of the user
- Media Server Proxy: The Content Service Provider will modify the router's configuration and thus enable to show the contents in the Residential Gateway like a local Media Server



Prototype


HP 5450
Windows Pocket 2002
MS: Intel Micro Server
MR: Intel Micro Render
Nokia 770
Internet Tablet OS2006
CP,MR: Media Streamer
Tablet PC Motion Computer
Windows Tablet PC Edition 2005
CP,MS: Windows Media Connect / Intel Media Server
MR:Intel Media Renderer
Laptop Dell C400
Debian GNU / Linux 3.1
MS: MediaGate
MR: GMediaRender
TFT Monitor
RGW: Embedded PC LEX CV860A
Ubuntu Linux 6.06
OSGi: Oscar 1.5
CP: Cidero
MS: MediaGate
MR: GmediaRenderer
Linksys WRT54GL Access Point Wireless

Results

- Interoperability of different platforms successfully (Linux, XP, Symbian,…)
- Automatic configuration of multimedia devices on OSGi Platform
- Concept and implementation of a Proxy Media Server that offers locally the contents of a remote server

Conclusions and Future Work

- We achieve our objectives:
  - ✓ The prototype can manage multiple services and devices
    - Using OSGi
  - ✓ The multimedia devices can be configured automatically
    - Using UPnP
  - ✓ Discovery remote services like a local service is now possible
    - Using UPnP Media Server Proxy
- We used open source software
- In future work support management of QoS

Questions?

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