Ametsa: a Generic Home Control System based on UPnP

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GET -- ENST Bretagne
France

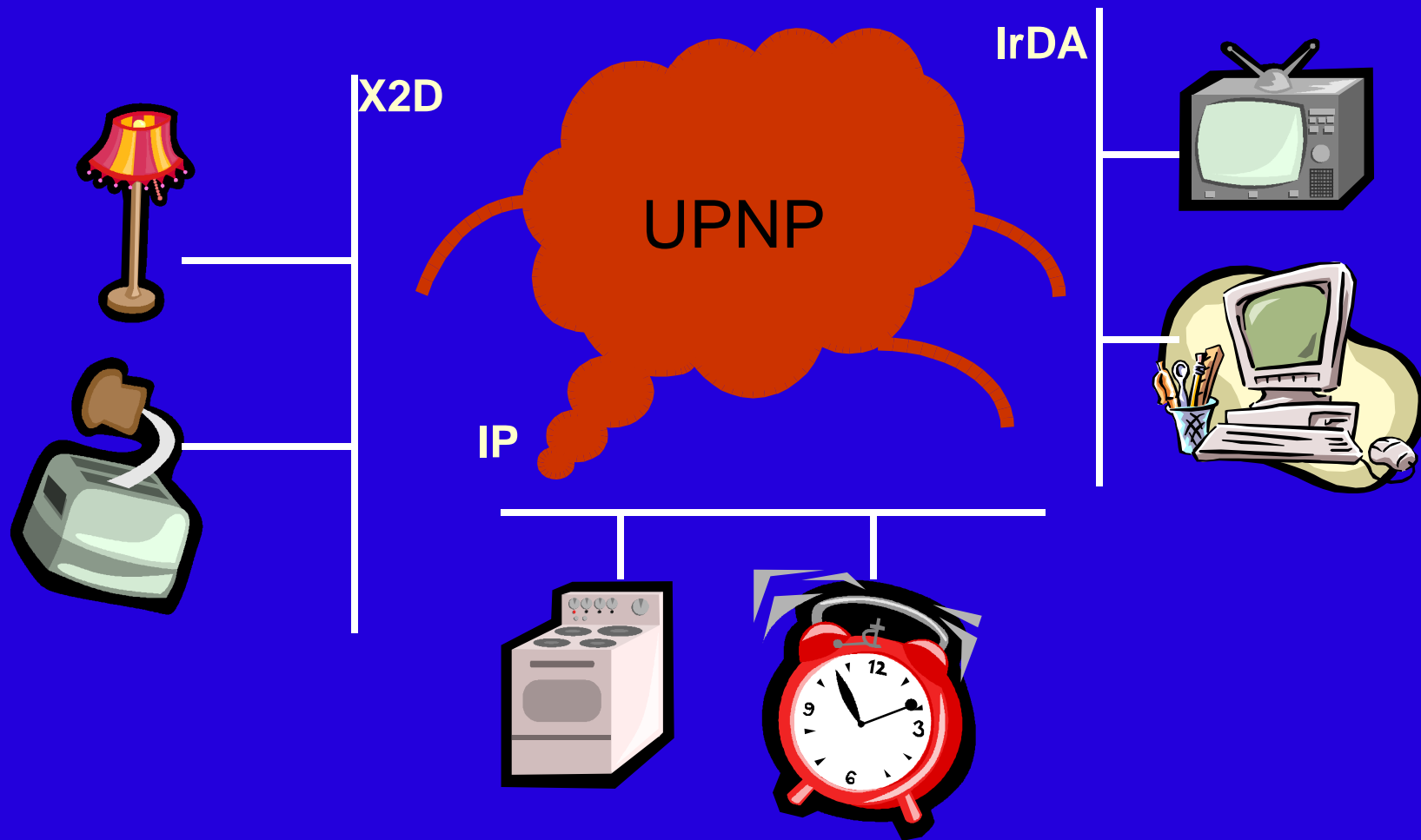# Outline

"Maison Intelligente" Project

UPnP Technology

Ametsa Control Point

UPnP-X2D/X10 Gateways

Conclusion and Future Work

"Maison Intelligente" Project

✗ Goals

Improve autonomy of impaired people by proposing a universal home control device
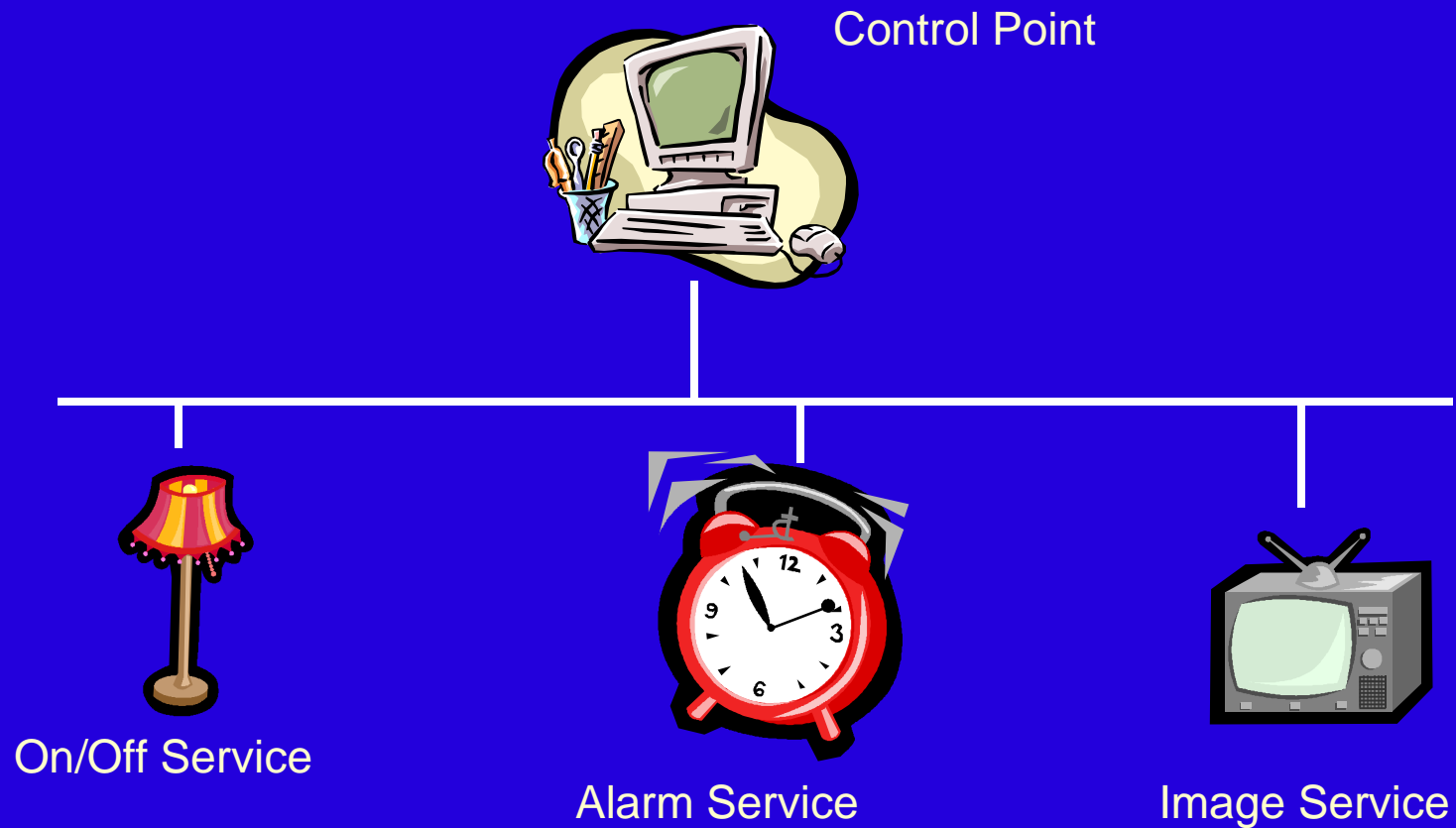
- ï Devices manufacturer independent

"Maison Intelligente" Project (2)

X2D

IrDA

UPNP

IP

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UPnP: Universal Plug and Play

Peer-to-Peer local network connectivity of intelligent appliances, wireless devices and PCs

Standard-based connectivity to ad-hoc or unmanaged networks

Uses IP, TCP, UDP, HTTP, and XML

UPnP Components

Control Point

On/Off Service

Alarm Service

Image Service

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UPnP (2)

✗ UPnP devices

  Auto IP configuration

  Convey their capabilities

  Leave the network smoothly

✗ UPnP control points

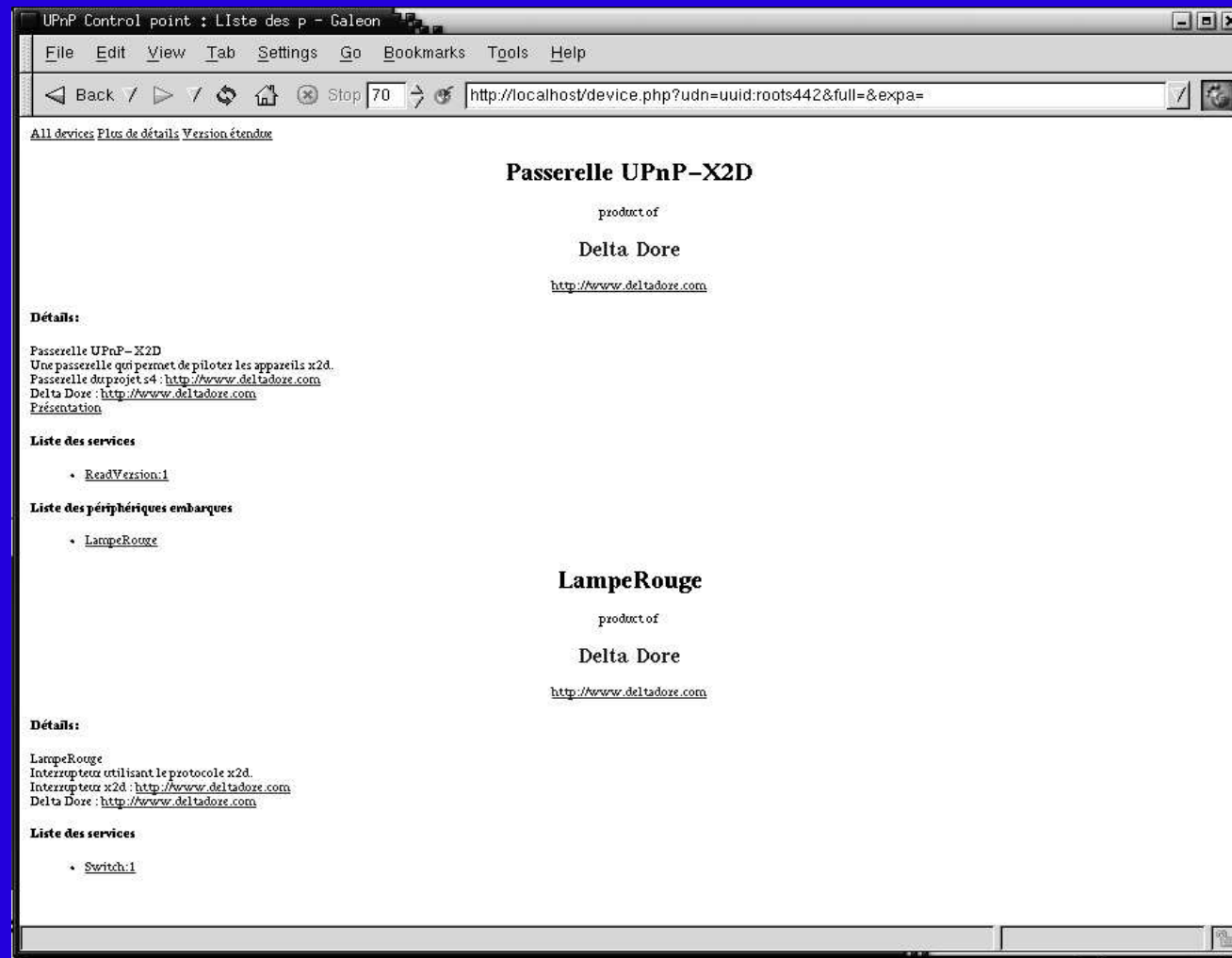 Learn about the presence and capabilities of devices

  Use those capabilities

UPnP Protocols

✗ Address configuration
    Auto-IP, DHCP

✗ Discovery and search

    SSDP, MSEARCH

✗ Control

    SOAP

✗ Events

    GENA

Ametsa Control Point

✗ Developped upon the Intel's UPnP implementation

✗ Learns about the state of the UPnP network

   Available UPnP devices

   State of their services represented by a (set of) variable (e.g. *Control* variable for the On/Off service of a lamp)

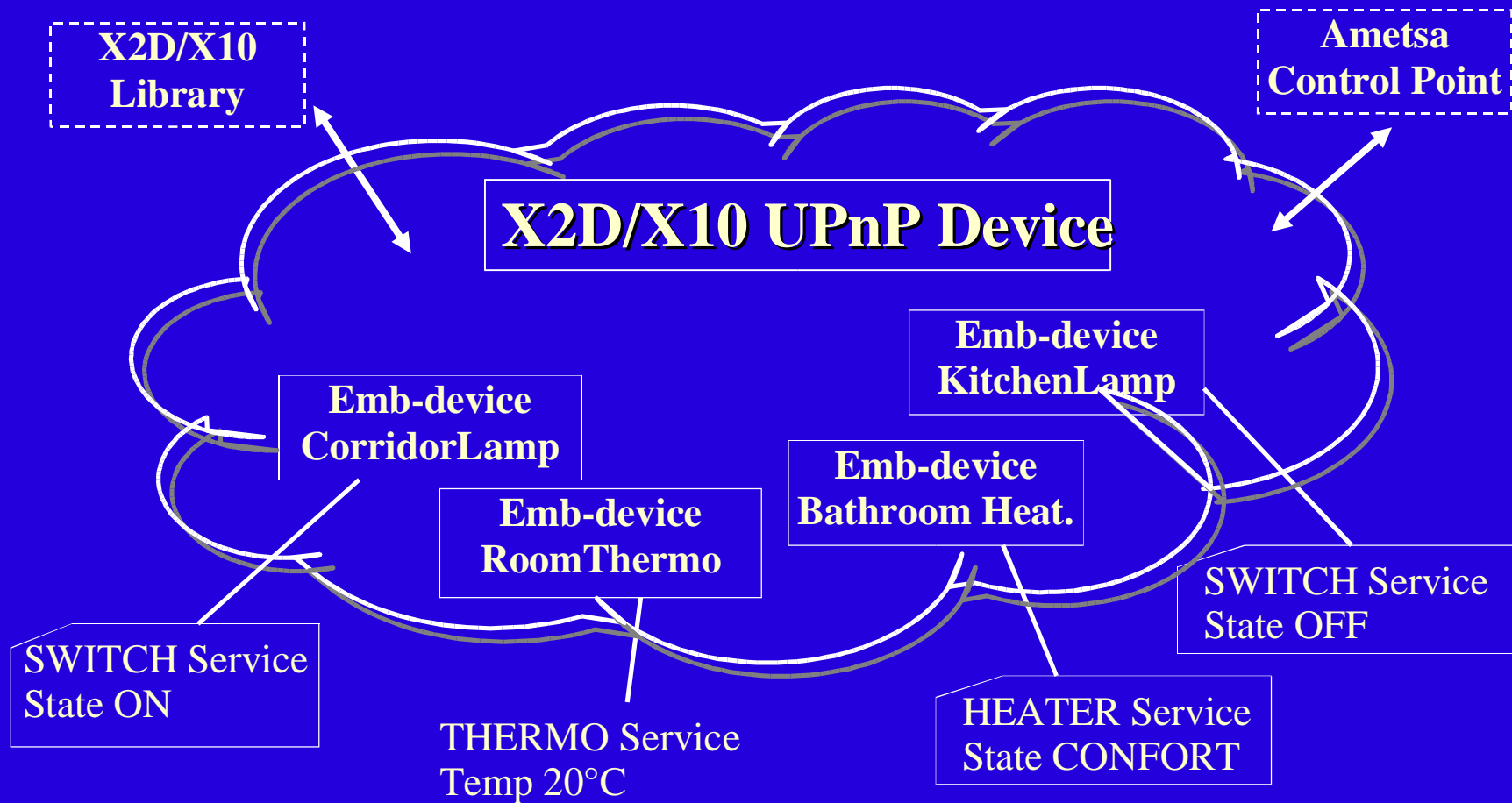✗ Sends actions to devices

✗ Accessible via a shell and SOAP interfaces

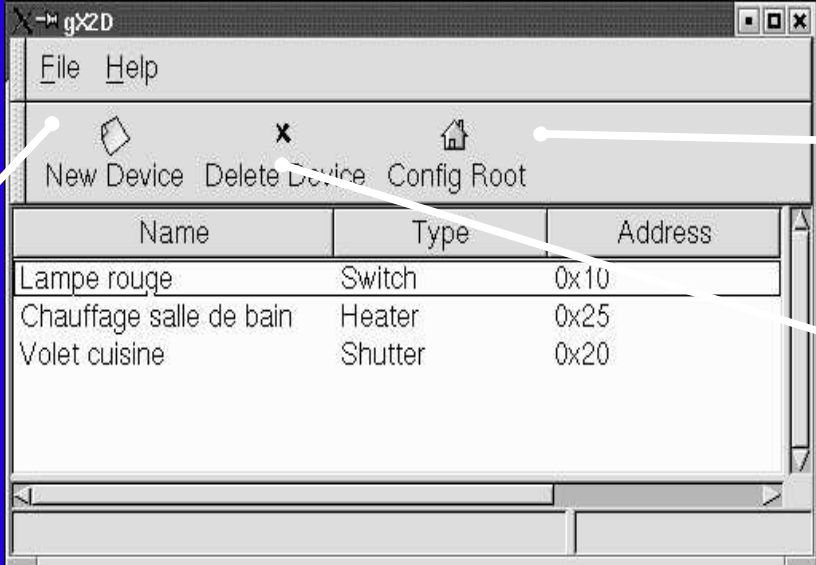# Ametsa User Interface

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UPnP-X2D/X10 Gateways

✗ X2D, X10

Powerline and radio communication protocols

Frequently used to control home devices

✗ Need for a gateway to the UPnP network

Implemented as an UPnP device giving access to X2D/X10 physical devices (lamps, shutters, heating)

UPnP-X2D/X10 Gateways (2)

X2D/X10
Library

Ametsa
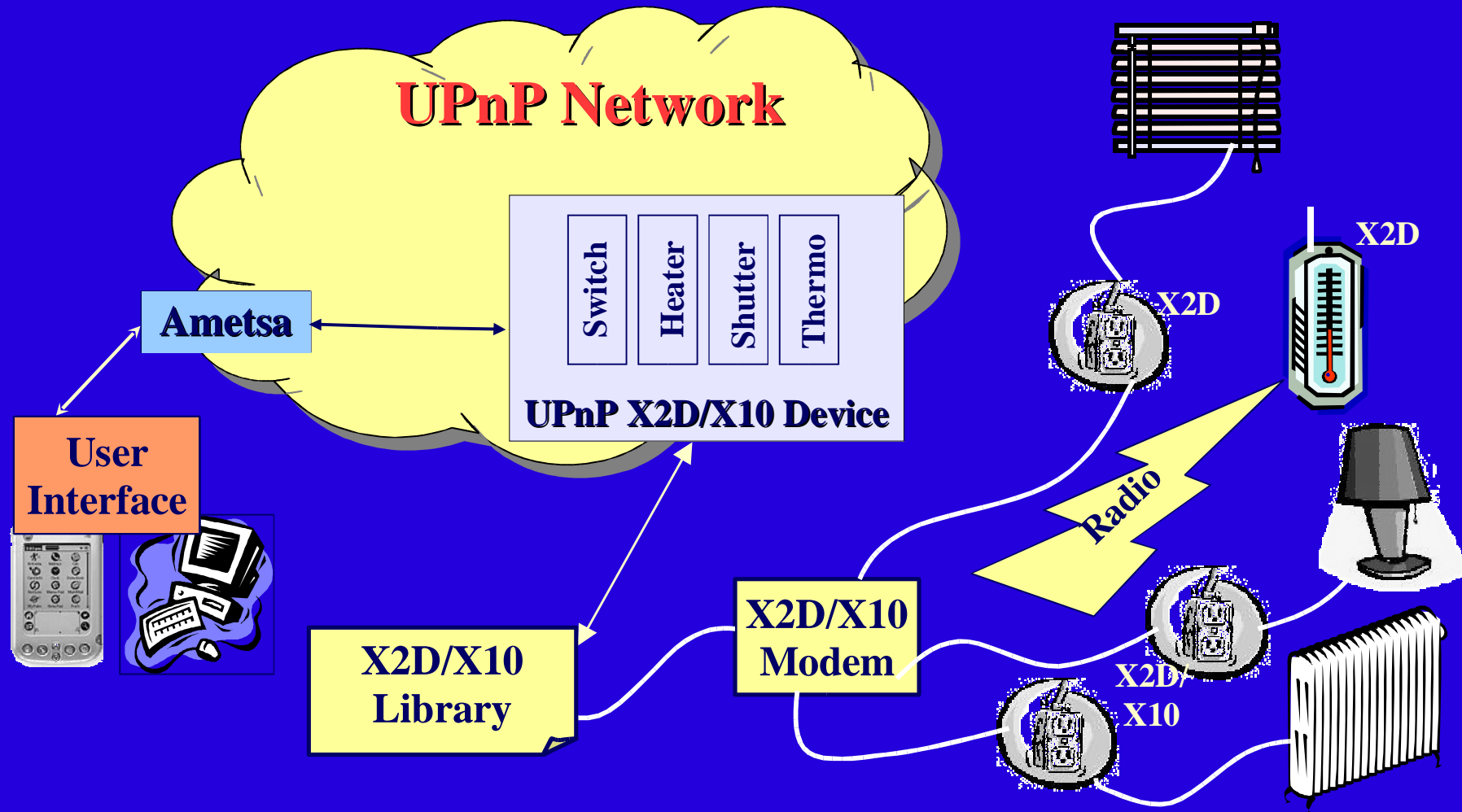Control Point

X2D/X10 UPnP Device

Emb-device
KitchenLamp

Emb-device
CorridorLamp

Emb-device
Bathroom Heat.

Emb-device
RoomThermo

SWITCH Service
State OFF

SWITCH Service
State ON

THERMO Service
Temp 20°C

HEATER Service
State CONFORT

Gateways Administration Interface

Add/delete a X2D/X10 device

Add

Basic Configuration

Delete

Experimentation Platform

UPnP Network

UPnP X2D/X10 Device
- Switch
- Heater
- Shutter
- Thermo

Ametsa

User Interface

X2D/X10 Library

X2D/X10 Modem

Radio

X2D

X2D

X2D

X2D/ X10

Conclusion and Future Work

✗ Generic home control system

Based on a standard technology

Devices manufacturers independent

✗ Work in progress

Python-based UPnP implementation

Ametsa v2: CORBA interface+python UPnP

Adaptation to blind people

Programming a list of actions to be performed

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