

The HYDRA project



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IST-2005-034891



Hydra Project vision

The vision of the HYDRA project is to create a widely deployed middleware for intelligent networked embedded systems that enables:

- Cost effective development of innovative ambient intelligence solutions
- Low cost for device manufacturers to be part of “Internet of things”
- Secure and reliable services for end-users

Project technical objectives

- Develop a middleware for networked embedded systems based on a Service-oriented Architecture including:
 - Support for distributed as well as centralised ambient intelligent architectures
 - Support for reflective properties of components of the middleware
 - Support for security and trust enabling components
- Develop a generic semantic model-based architecture supporting model-driven development of ambient intelligence applications.

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Project technical objectives

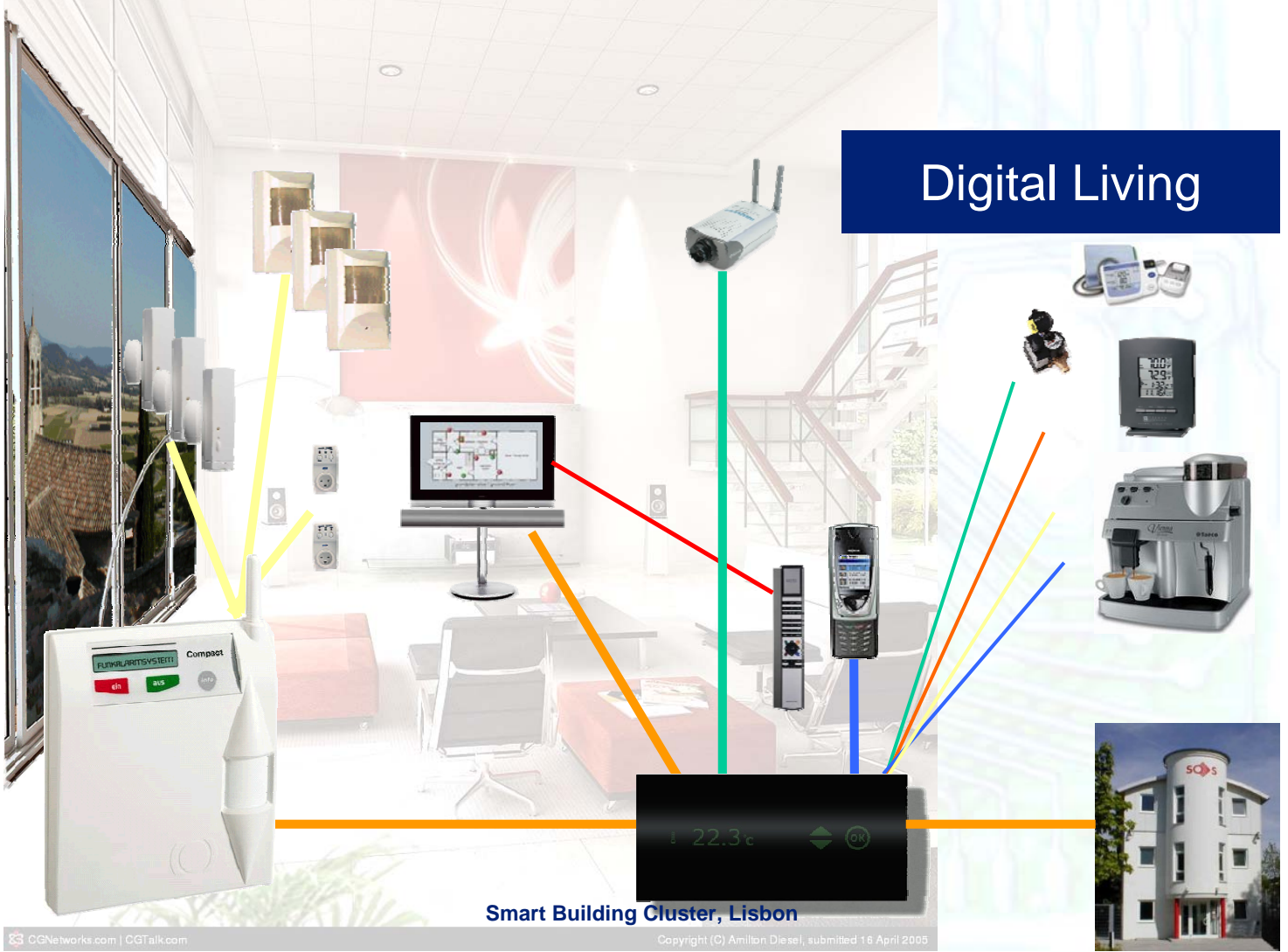
- Tools for solutions providers, SDK
 - Easy to integrate and use devices in applications
 - Hide complexity of underlying network and device access protocols
 - Integrated into familiar programming environments
- Tools for device manufacturers, DDK
 - Low cost for networking devices
 - Support for their devices to be part of “Internet of Things”

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Digital Living



Monitor your health



Cooler pigs



Device Accessibility



HVAC Status



Water Flow

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Hydra brings semantics and web services to the embedded world.

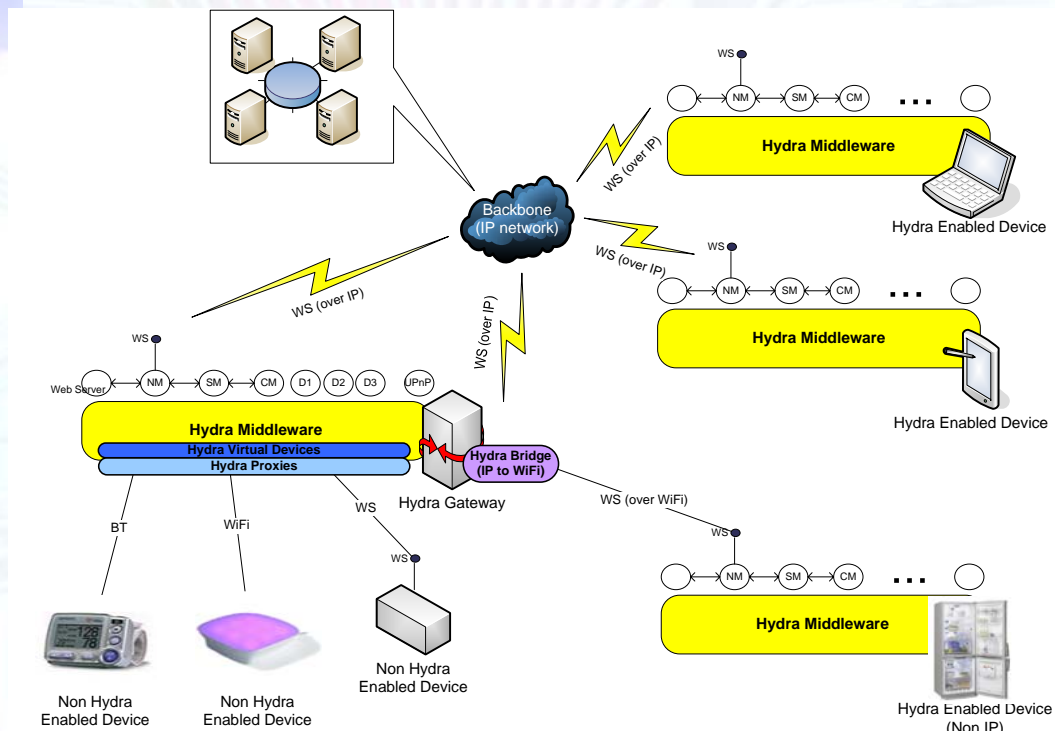
- SoA (Service Oriented Architecture)
 - Each device, sensor and actuator is represented as a web service
 - Each middleware component is a web service in itself (centralised or distributed ambient intelligence architecture)
- Semantic Model Driven Architecture
 - Device Ontology
 - Security Ontology
 - Software Components Ontology

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Hydra Device Network

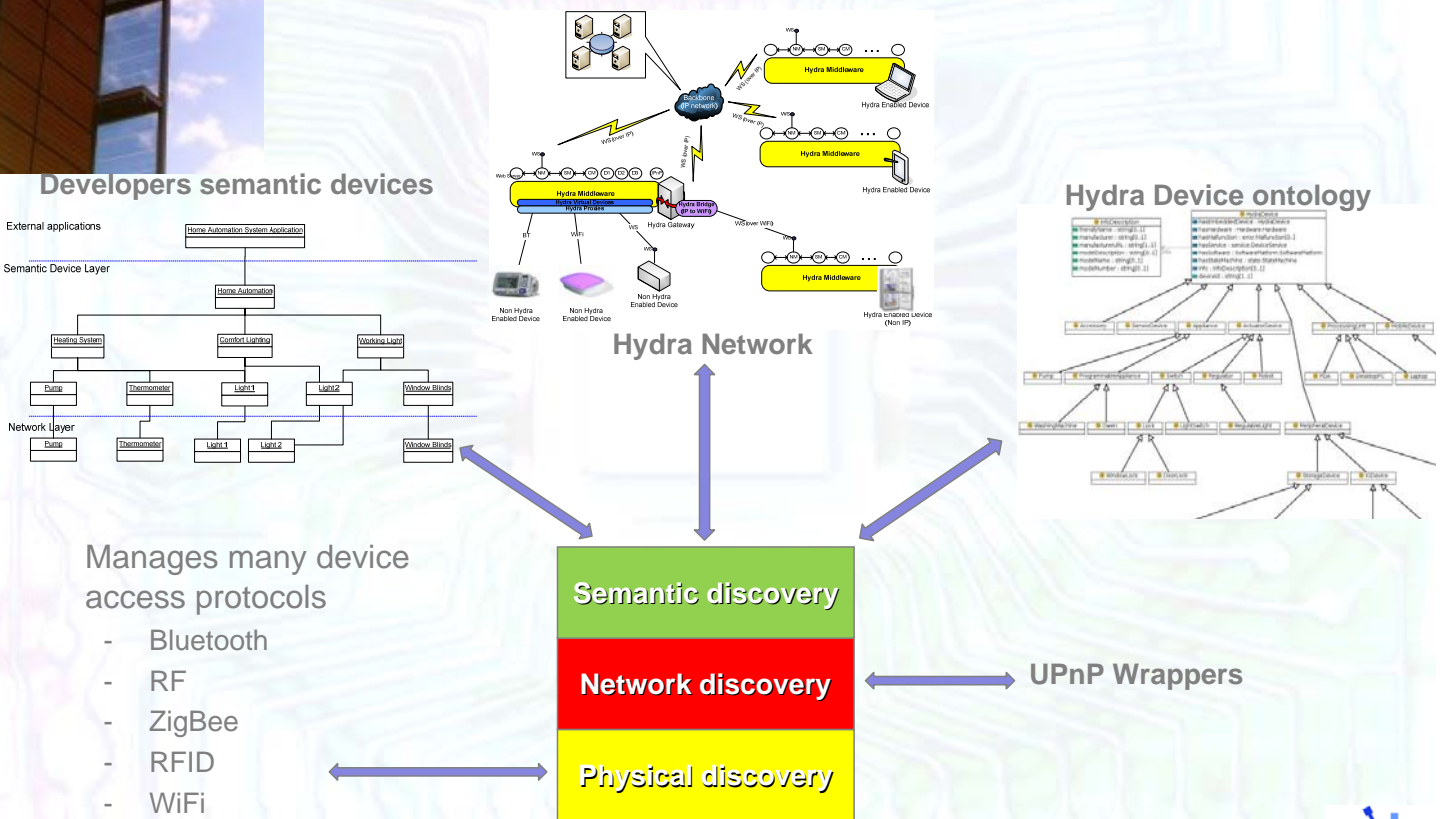


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3-layered Discovery architecture



Manages many device access protocols

- Bluetooth
- RF
- ZigBee
- RFID
- WiFi
- Serial ports

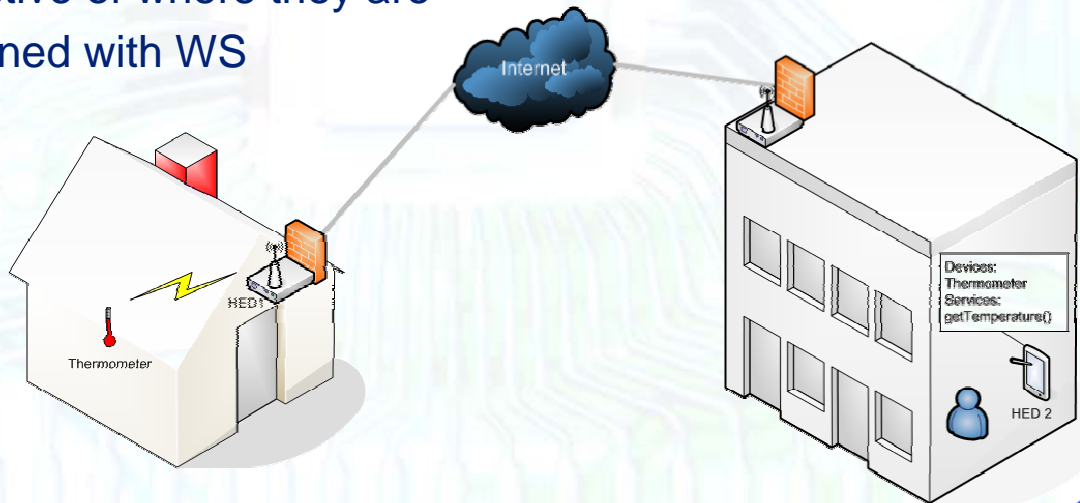
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P2P and SOAP Tunnelling

- P2P architecture for Device Networks
 - Accessing and controlling devices irrespective of where they are
- P2P combined with WS



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Programming with Hydra: Accessing and Controlling physical devices

```
ApplicationDeviceManager myMgr=new ApplicationDeviceManager ();
```

Create WS for devices

```
WindMeter.HydraDeviceWS myWindmeter = new WindMeter.HydraDeviceWS();  
myWindMeter.SetHID(myMgr.GetHID("CNetWindmeter"));
```

```
Light.HydraDeviceWS myLight = new new Light.HydraDeviceWS();  
myLight.SetHID(myMgr.GetHID("CNetLight"));
```

.....
Check Windspeed and send
alert SMS if above limit

```
if (myWindmeter.GetWindSpeed() > 1.8)  
{  
    myLight.Flash(3);  
    myPhone.SendsSMS("Chaos at CNet office, windspeed:" +  
        myWindmeter.GetWindSpeed()+ "+46707933542");  
}
```

Check Rain and play new
music if above limit

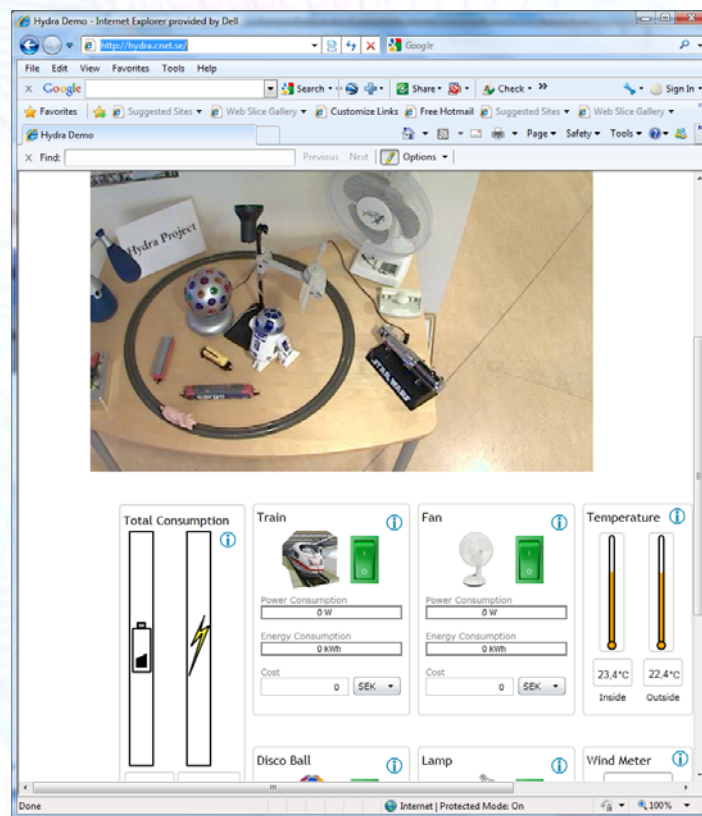
```
if (myRainSensor.GetRainLast1H(> 5.0)  
{  
    myLight.Flash(4);  
    myRenderer.SetAVTransportURI(0, "http://212.214.80.152/singingintherain.mp3", "");  
    myRenderer.Play(0, "1");  
}
```

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Online Demo hydra.cnet.se



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Project Data

- 4,5-year (20060701-20101231)
- FP6 Integrated Project, co-financed by European Commission
- 13 partners
- 12,5 MEuro budget, 1300 pms.

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