

ICT for Sustainable Homes: HGI Approach

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HGI

CONNECTING HOMES, ENABLING SERVICES

HGI quick snapshot

- Broadband service providers + Home networking vendors
- Requirements for HG, home network, services and enablers
- Motivations to focus on sustainability
 - Regulatory push
 - Customer demand for green products
 - Business opportunity for service providers
- This presentation describes the practical steps HGI is taking to increase energy efficiency in the home by setting clear requirements for manufacturers

Broadband Service Providers

Digital Home ecosystem vendors



HGI

Connecting Homes, Enabling Services



Key HGI outputs

Requirements Documents

- Reference documents for use in procurement
- Specific and clear requirements at functional and feature level

Examples :

- HG requirements (residential profile)
- HG Multisession handling
- Small Business Gateway
- HG – NT interworking
- NGA capable Network Termination
- Home Network infrastructure device requirements

energy efficiency

- **Energy Efficient Home Gateway**
- **Common Power Supply**
- **Home Energy management and control service**
- HG Software Modularity Requirements
- In-home Diagnostics
- HG Parental Control Feature
- HG IMS requirements

HGI's Energy Efficiency Work

HGI Energy Phase 1

- Energy Efficiency of home gateways
- HG test program including energy efficiency

HGI Energy Phase 2

- Energy Efficiency of the home network and end devices

HGI Energy Phase 3

- Services to allow customers to manage and control their energy consumption

Home Gateway Energy Efficiency

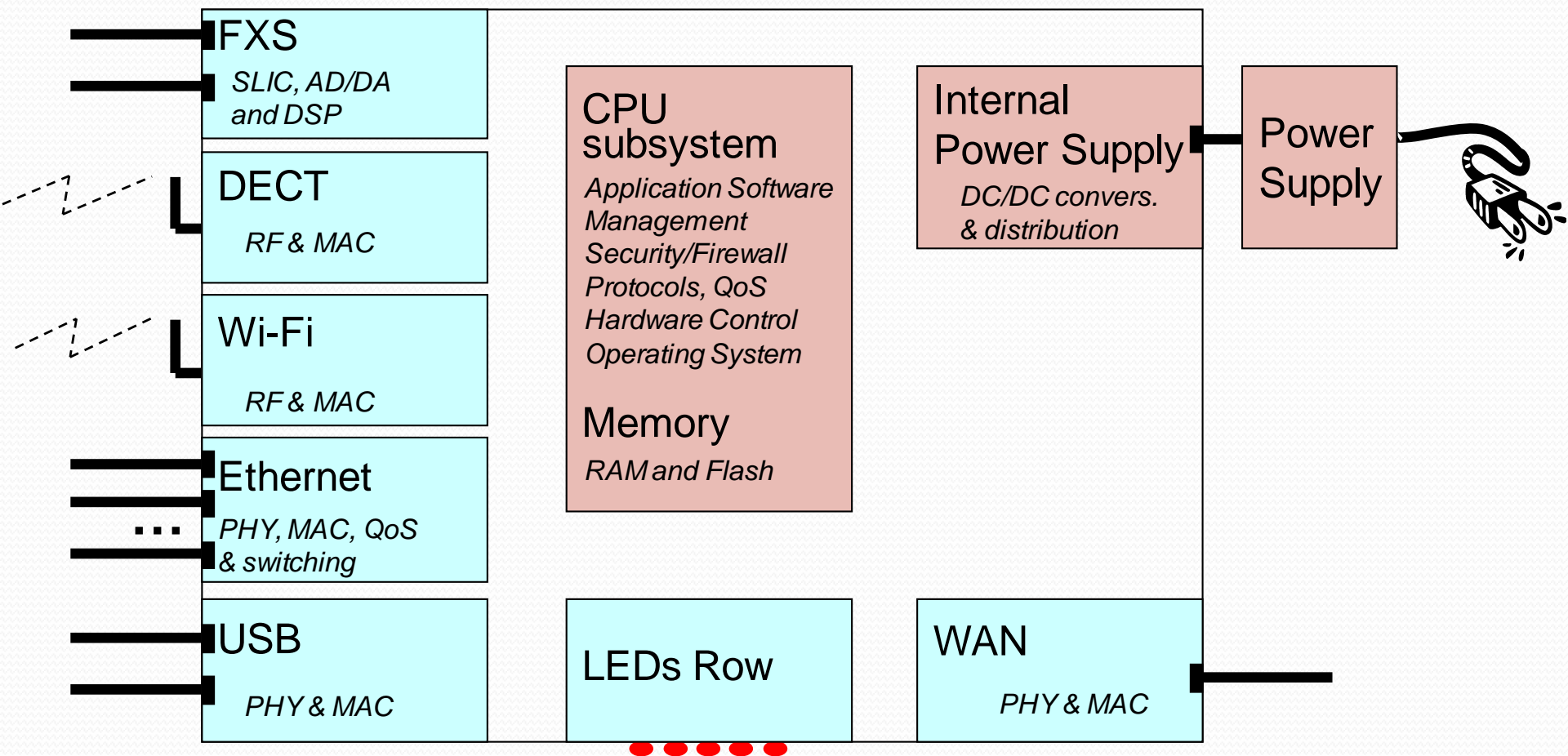
Achieve lowest power possible for the services supported and active



Why should HGI worry about HG Energy Efficiency?

- HG is (normally) always-on, and consumes substantial amount of energy in a 24-hour period
- Impact of EU Code of Conduct in spurring the industry has been substantial.
- HGI has played a major role in definition of CoC → modularisation approach at right granularity
- Energy savings in HG readily attainable
 - HGI has clarified best-practice approaches in HG design
 - Modularization approach
 - Focus on interfaces
 - Must consider services requirements very closely
- HG testing methods needed to validate energy efficiency

HG Modular Approach

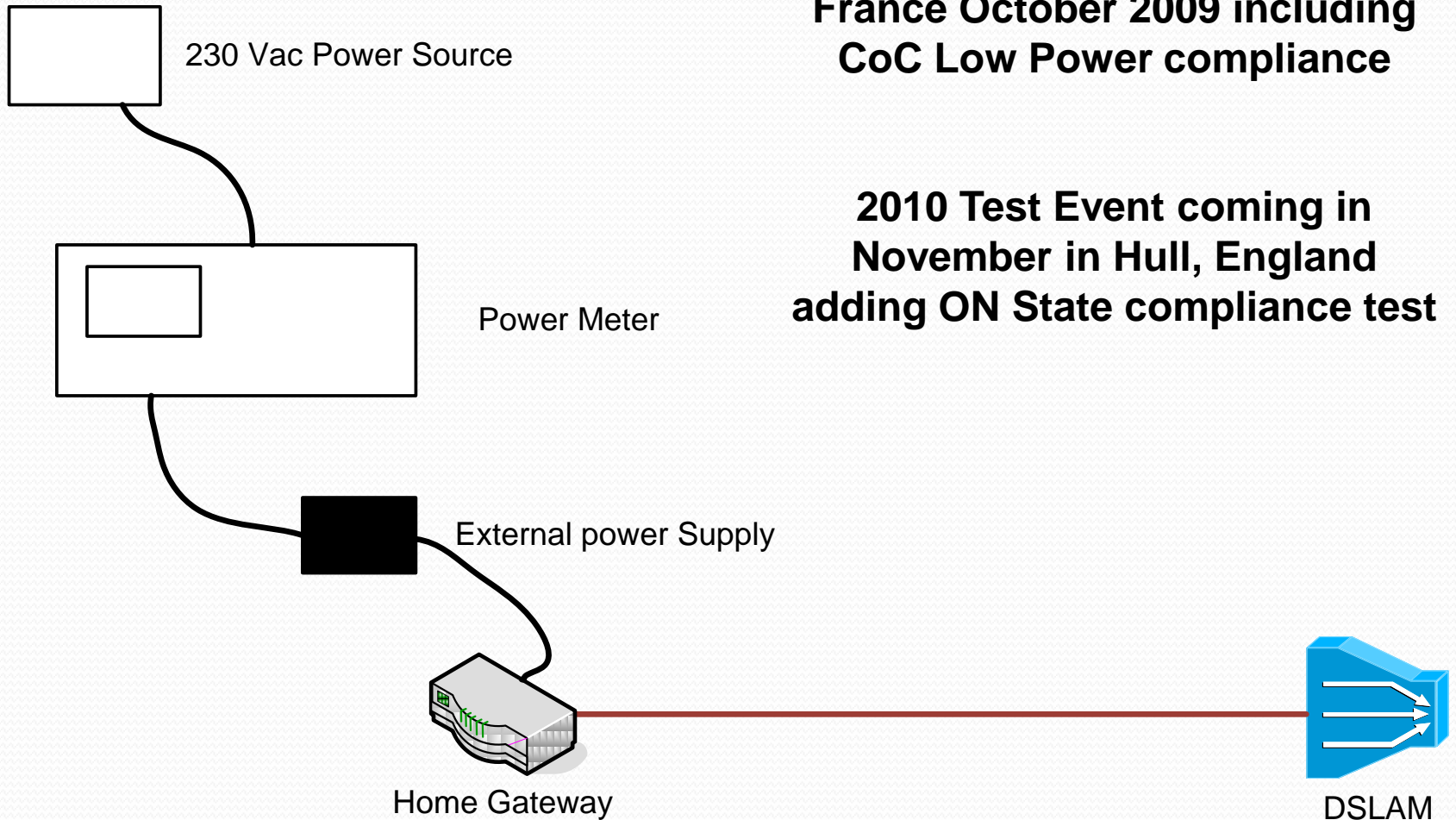


See RD009 at <http://www.homegateway.org/documents>

HG Energy Measurement

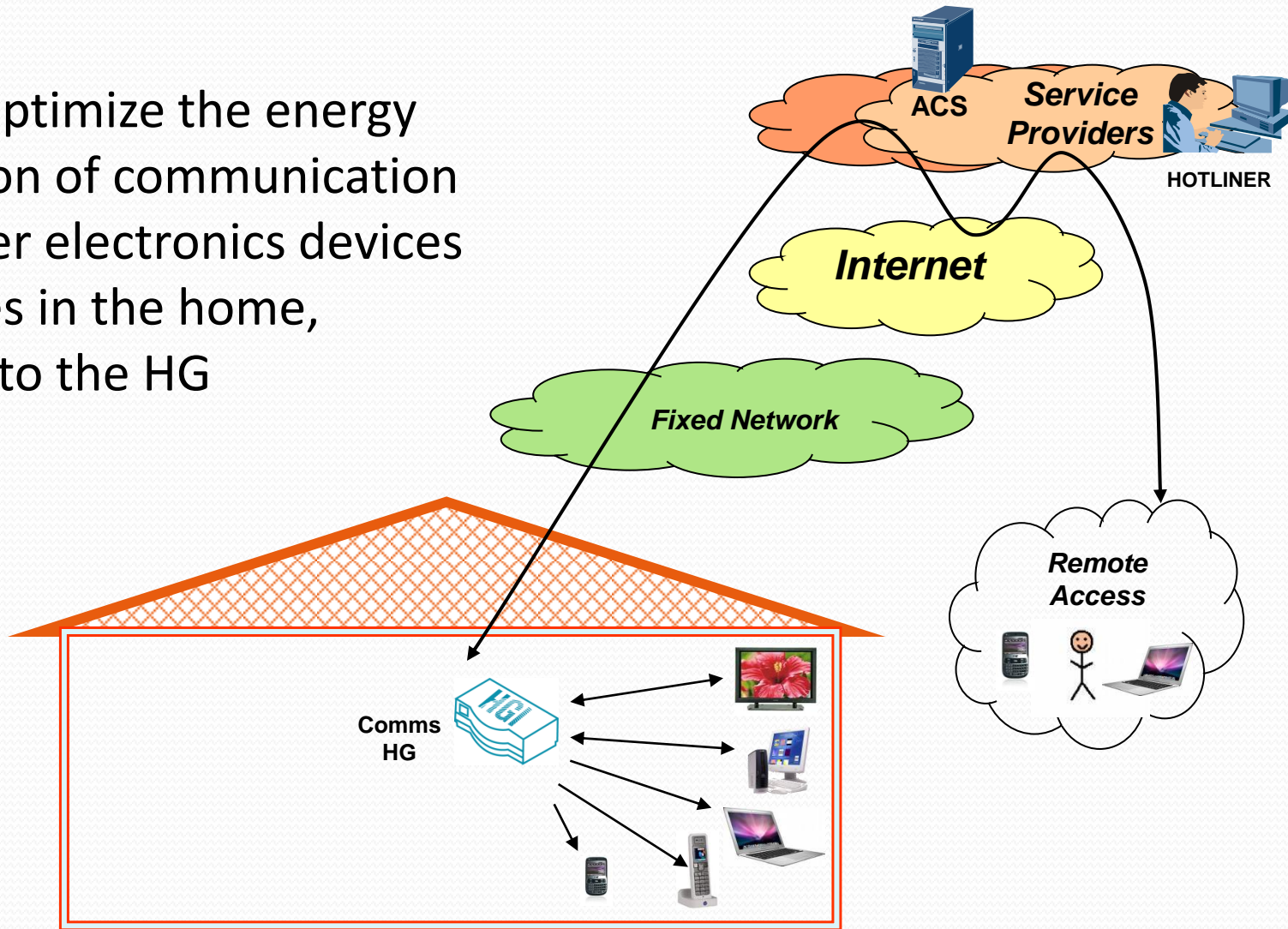
First HGI Test Event in Lannion, France October 2009 including CoC Low Power compliance

2010 Test Event coming in November in Hull, England adding ON State compliance test



HGI Energy Phase 2 goals

Methods to optimize the energy consumption of communication or consumer electronics devices and services in the home, connected to the HG



What we need, Phase 2

- Common framework to address power management of “triple play” home elements
- This involves consideration of
 - Home gateway
 - Remote management
 - Proxying for non TR-069 managed devices
 - Appropriate use of home network control mechanisms
- Technology and end-device specific analysis
- Builds on interface technology analysis begun in Phase 1

Common Power Supply

- Defines power brick applicable to Home Gateways and other devices
 - Voltage
 - Amperage
 - Connectors
 - Eco-design attributes
- Benefits: uniform specification; reuse of power bricks across devices; energy efficiency; lower life-cycle eco-impact
- Published by HGI and Shared with ETSI and ITU in January 2010 to facilitate standardisation

CPS categories

Category	Nameplate Output voltage	Nameplate Output Current	Rated Output Power
TYPE 1	5 V	2 A	10 W
TYPE 2 subcategory 1 (TYPE 2-1)	12 V	2 A	24 W
TYPE 2 subcategory 2 (TYPE 2-2)	12 V	5 A	60 W

HGI Energy Phase 3 – Home Energy Management and Control

- Consumers need to understand, visualise, monitor, and control the energy being consumed in their home
 - Awareness → lower consumption
- Various approaches from
 - Energy Providers
 - Smart Meter
 - Over the top providers
 - Broadband Service Providers (BSP)
- HGI is articulating **the role of BSP** & looking for collaboration among the different players

Phase 3 starting points

- June 2009 invitation of stakeholders to HGI meeting in Sophia Antipolis
 - Beywatch, IPSO, Cenelec, Zigbee, Z-wave, KNX, LONWorks
- May 2010: special HGI workshop on smart energy services in Madrid
 - Energy cos, Beywatch, Energy@Home, ETSI M2M, ETSI TISPAN, BBF
- ➔ Output of Madrid: agreement among the HGI service providers to identify a **common architecture framework, common service requirements, and common platform requirements**
- ➔ Starting point: **Energy@Home** and **Beywatch** work

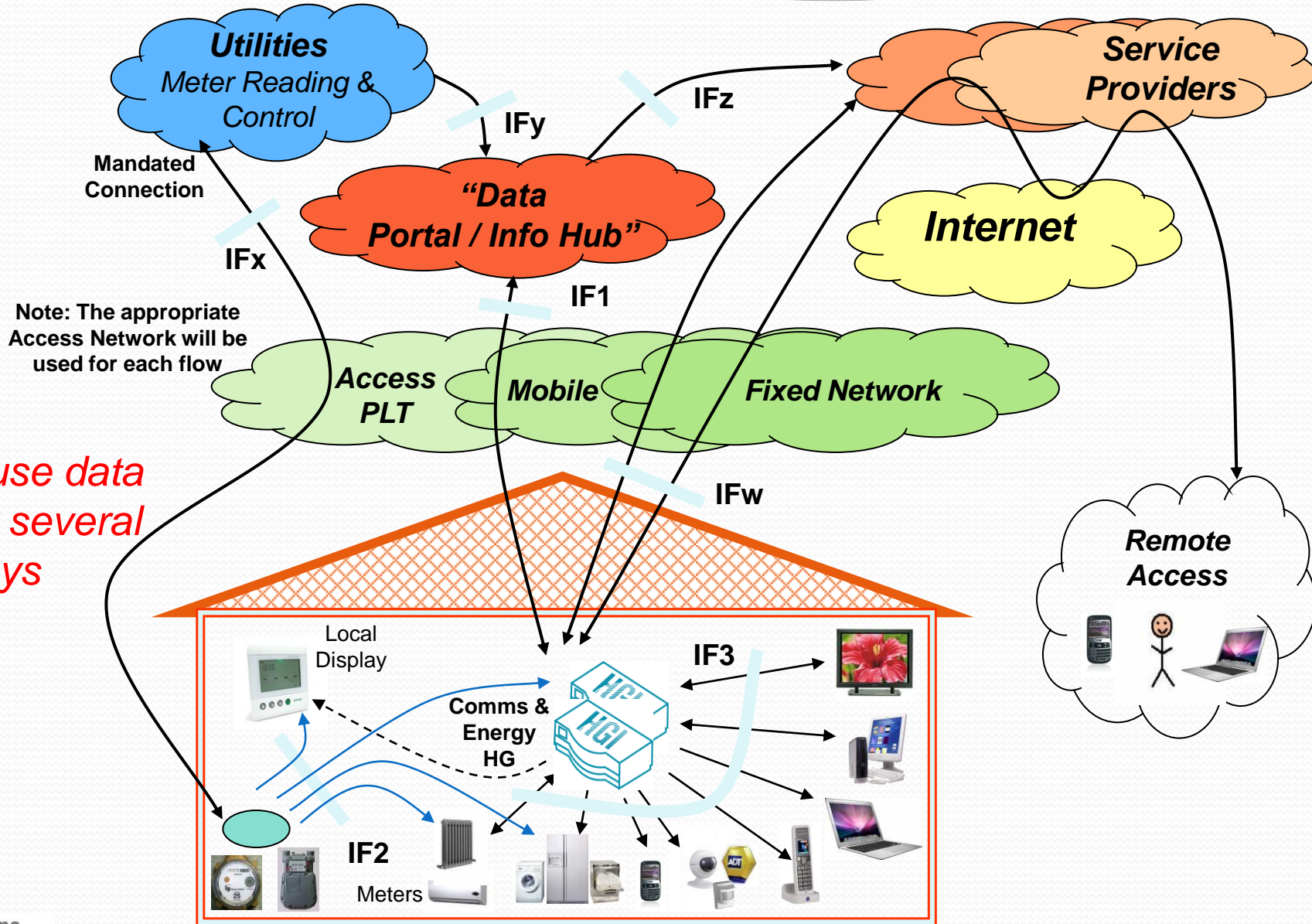
Phase 3 Outputs to Include

- Use Cases
- End-end architecture
- Data flow requirements
- Interface requirements
- Application requirements in Home Gateway
 - Software modularity environment
 - Service Logic
- Remote Access Requirements
- Security Requirements
- Quality of Service Requirements

Use cases examples

- Visualisation
 - Of current energy use
 - Of historical energy use
- Overload or blackout
 - Notification/alarm service
 - Overload situation load management
- Demand response
- Costing control
 - Tariffs optimiser
 - Monthly cost limit
 - Time of day scheduling
- Information services
 - energy “mix”
 - Appliance configuration

Understanding the Components

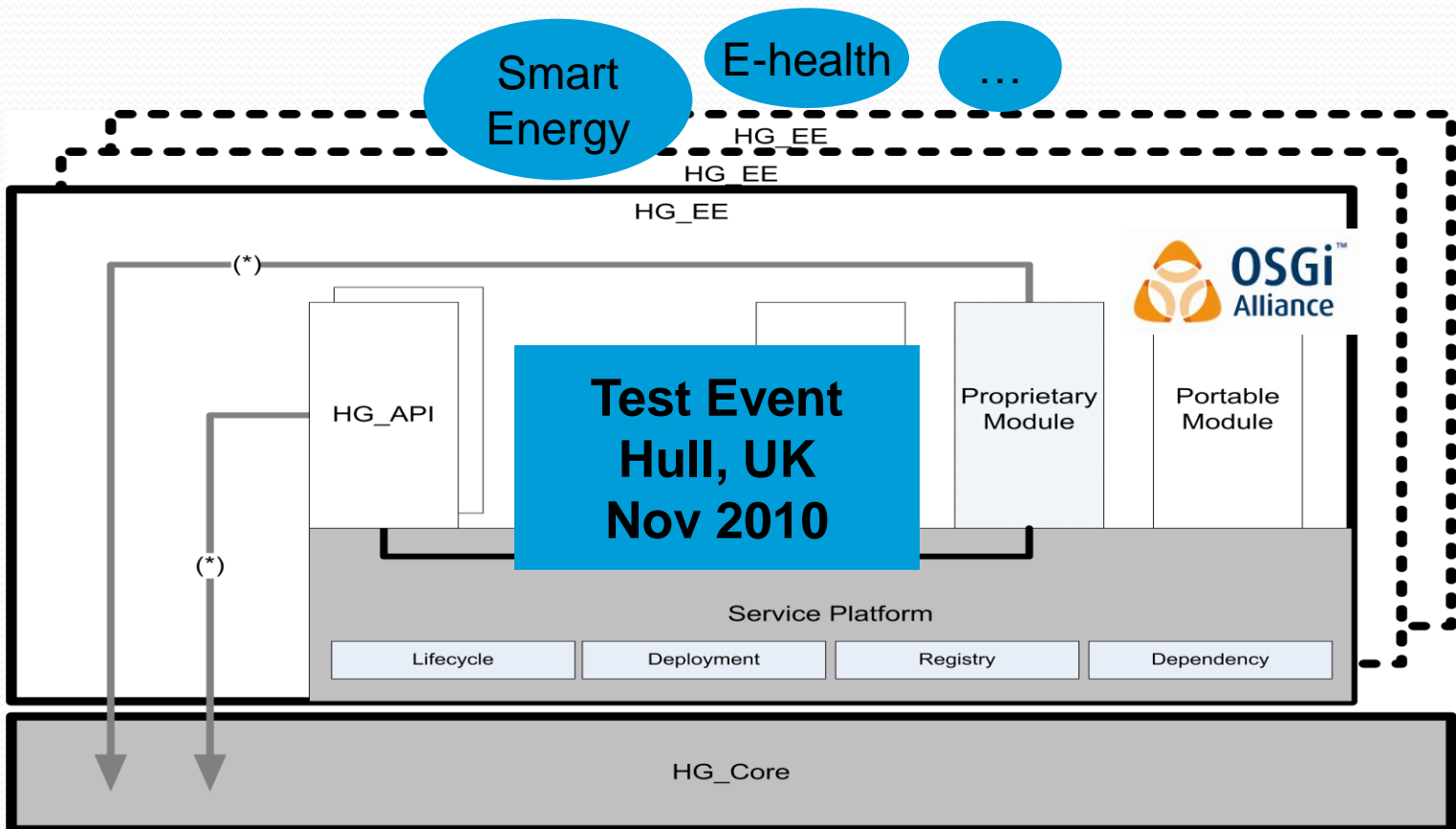


Application logic

- Elements
 - User interface
 - Remote access
 - Presenting information on tariffs and “smart grid requests”
 - Interaction with white goods & smart meter
- HG based software module is a leading candidate among other models (USB based dongle; separate Energy Gateway, etc.)
- Dynamic HG software deployment key to flexibility
- Key issue being addressed by HGI: how to ensure that the flexible HG software platform still provides assured QoS to data flows

HGI S/W Modularity Architecture

1. Detailed HGI requirements for a software platform on HG
2. Detailed an OSGi solution
3. Make it happen via HG test event with common tools



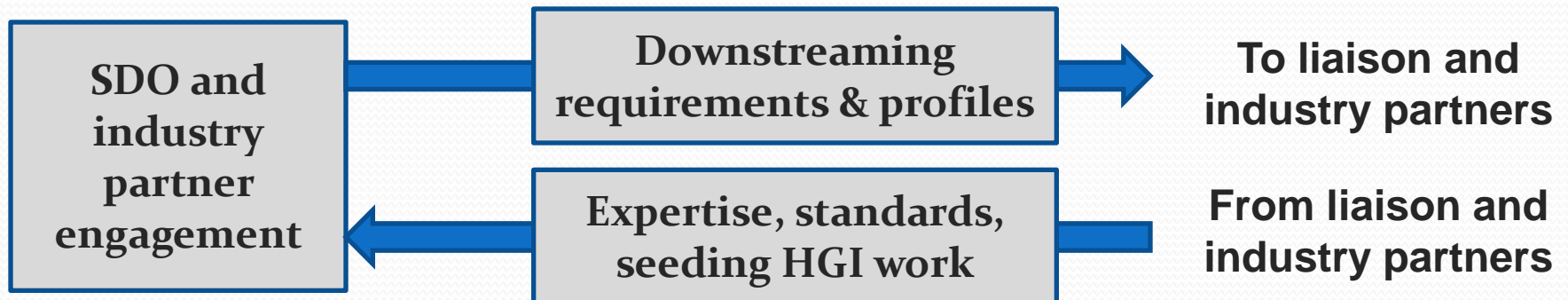
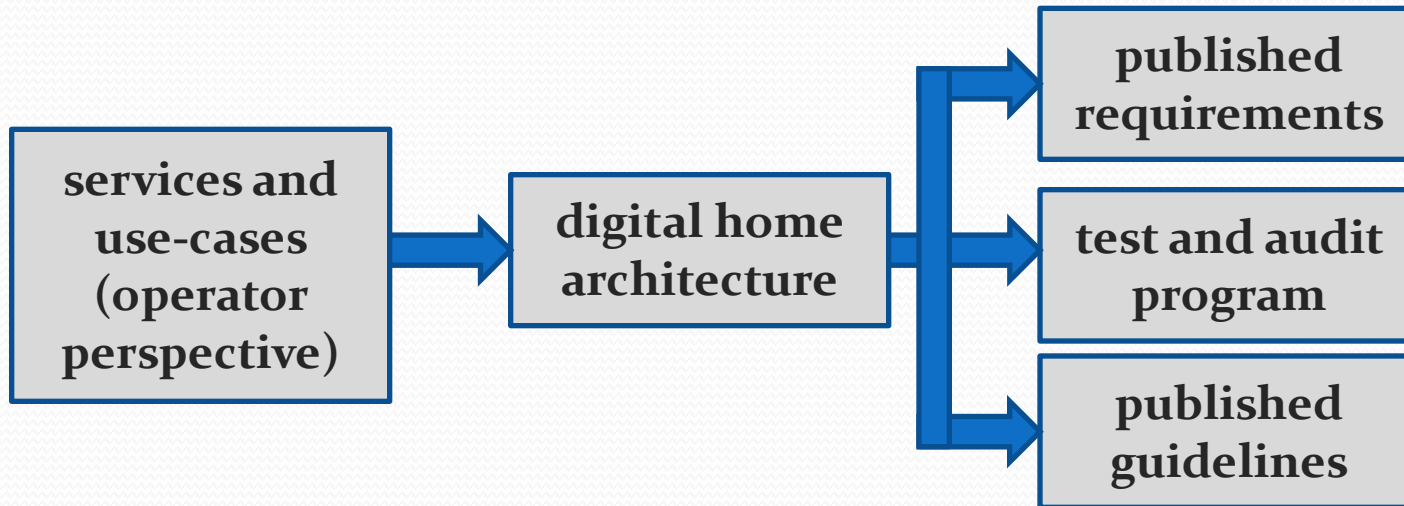
(*) Proprietary

Summary

- HGI has already accomplished substantial work in sustainability (EU Code of Conduct input; Energy Efficient HG; Common Power Supply; HG Test Event)
- Phase 2 (home network) and Phase 3 (Home Energy management) work in progress
- NEXT STEPS:
 - HGI Meeting in Madrid, Dec 14-17 (focus day on Dec 16 for HEM service and demos)
 - To request observer status at our meeting or a copy of these materials please email me
duncan.bees@homegateway.org

Backup material

Scope of HGI work



HG Service goals

- Ensure that energy efficiency and low power modes do not disrupt user experience. Goals:
 - BROADBAND CONNECTION additional latency <1 sec
 - COMMUNICATIONS additional latency <1 sec
 - ENTERTAINMENT additional latency <1 sec
 - REMOTE ACCESS additional latency <3 sec
 - USB STORAGE additional latency <3 sec
 - PRINTER SHARING additional latency <3 sec
 - MEDIA SHARING additional latency <3 sec

Phase 2 elements

*Already published in 2010.
See RD015 at
[http://www.homegateway.org
/documents](http://www.homegateway.org/documents)*

- Common Power Supply
- DLNA and UPNP Devices
- Home Network Infrastructure Device examples
 - Ethernet device
 - Power Line bridge
 - WiFi bridge
- End Devices examples
 - FXS, DECT Phone
 - WIFI Station
 - Set Top Box
 - USB Device

Phase 3 Devices: Smart Meter

- **Smart Meter (SM)**, The meter is part of the grid, and is the property of the local authority, the Distribution Operator : the DSO (utility) as above defined,
 - able to provide real time measurements
 - support interfaces towards other elements in customer's environment
 - some smart meters are able to push information and get tariff information towards the grid / DSO through technologies like powerline
- **Local Display**
 - connects to Energy &/or Comms HG and displays usage statistics/costs etc.

Devices: Energy Gateway

- **Energy Gateway:** this entity is owned by the ESP & could be integrated into a next generation meter.

Main roles:

- Read meters & set tariffs for pay as you go
- Disconnect/reconnect supply when required
- Record and store usage, produce usage statistics & send to Local Display
- Control major energy using devices such as HVAC & white goods

Devices: HG

- **Communications HG.** This is the typical HG with broadband and multiple LAN technologies . It is owned by the customer or the BSP or ISP. Roles:
 - Could read meters & set tariffs if required
 - Record and analyse usage, produce usage statistics & send info and alerts to several display devices in the home: PCs, TVs, Local Display & DECT phones
 - Send alerts to mobile devices out of the home as required
 - Control major energy user devices and other devices in the home, as required

Other Devices

- Heating, Ventilating & AirCon
 - Could be controlled by the Energy or Comms HG
- White Goods
 - Could be controlled by the Energy or Comms HG
- Brown Goods
 - Likely to only connect to the Comms HG
- Security sensors / cameras etc.
 - Likely to only connect to the Comms HG
- PCs / Laptops etc.
 - Likely to only connect to the Comms HG
 - PCs & Laptops outside the home can also connect via the ISP
- TV & Settops
 - Likely to only connect to the Comms HG
- Display Phones / DECT Phones
 - Likely to only connect to the Comms HG
- Mobile Phones
 - Connect to the Comms HG from anywhere in or out of the home via the ISP

Influencing User Behaviour

Activity	HG impact
Collect usage data	Interface to Meter or Energy Gateway
Display	Interfaces to PC and TV, display format conversion
Analyse	Ability to run 3 rd part applications
Suggest	3 rd party apps + display
Control	Interfaces to individual devices, security, audit trail
Remote Control	Secure remote access
Spin-offs, Security	3 rd party apps, mobile alerts