

Homework: User-centric Networking

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with University of Glasgow, Imperial College London,
BT, Microsoft Research, Georgia Tech



Acknowledgements

- A three year project funded by EPSRC and RCUK
- Project partners as well as University of Nottingham:
 - University of Glasgow, Imperial College London
 - BT, Microsoft Research
 - Georgia Tech
- Ethnography and technology deployment to 24+ households
- Part of a wider agenda concerned with the redesign of (technology) infrastructure for use in domestic contexts

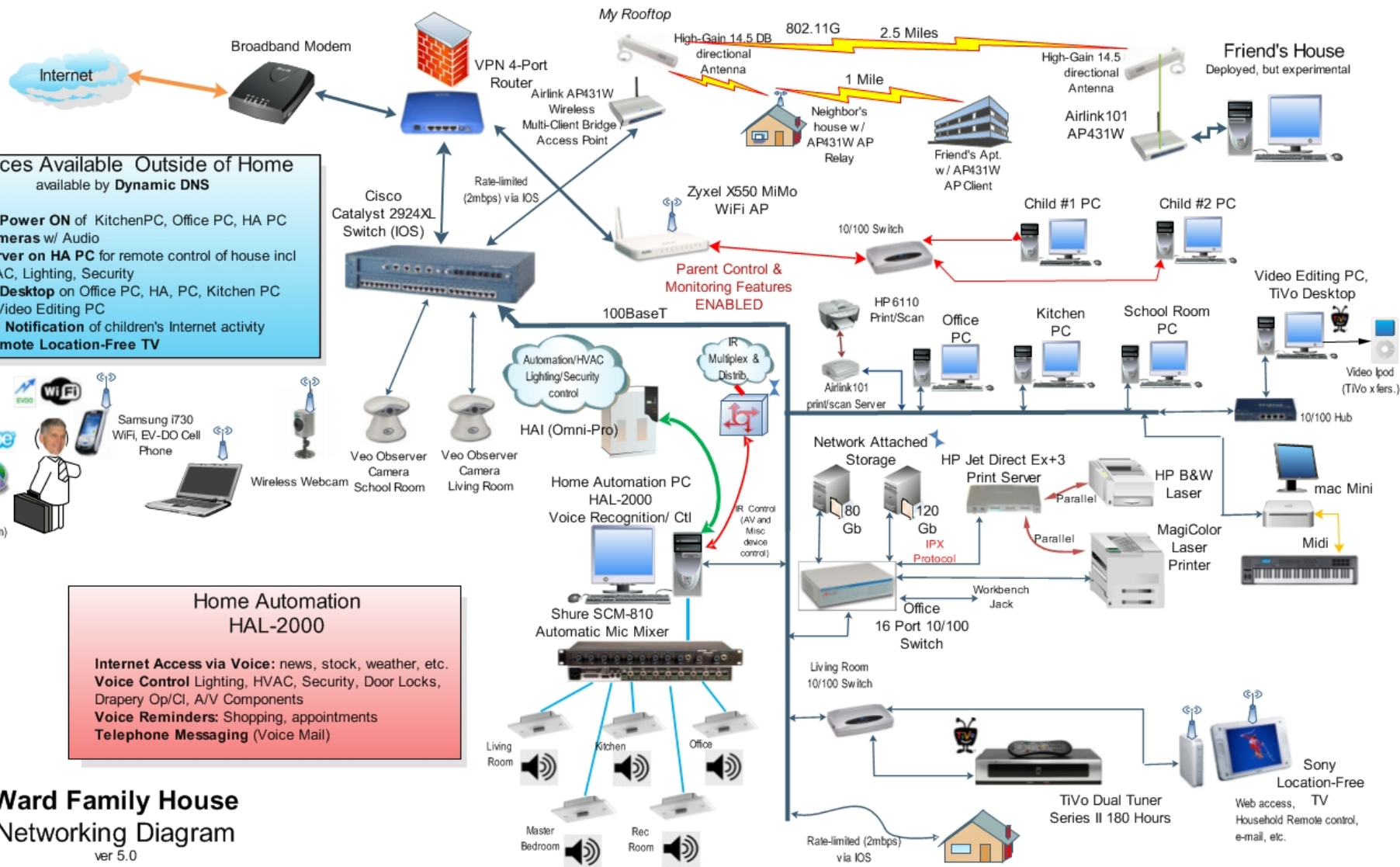
Why Homework?

300 million people worldwide have broadband connections to the Internet

Home networking gear is **the most returned** consumer electronics item stores (25%)

51% of UK households now have a broadband connection

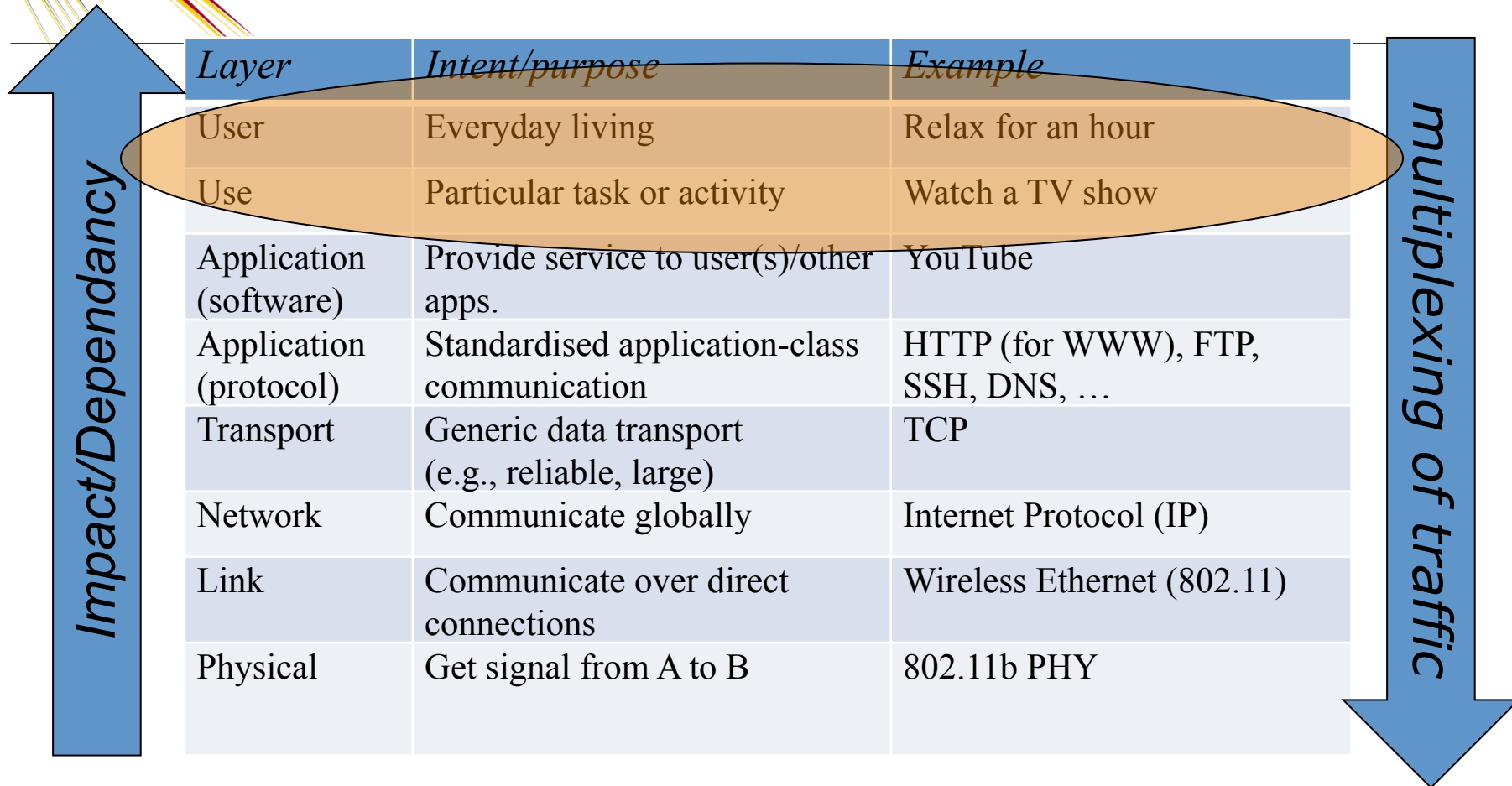
Consumers cite technical complexity as **the largest barrier** to home networking



Lived reality is messy and complex



Usage spans layers





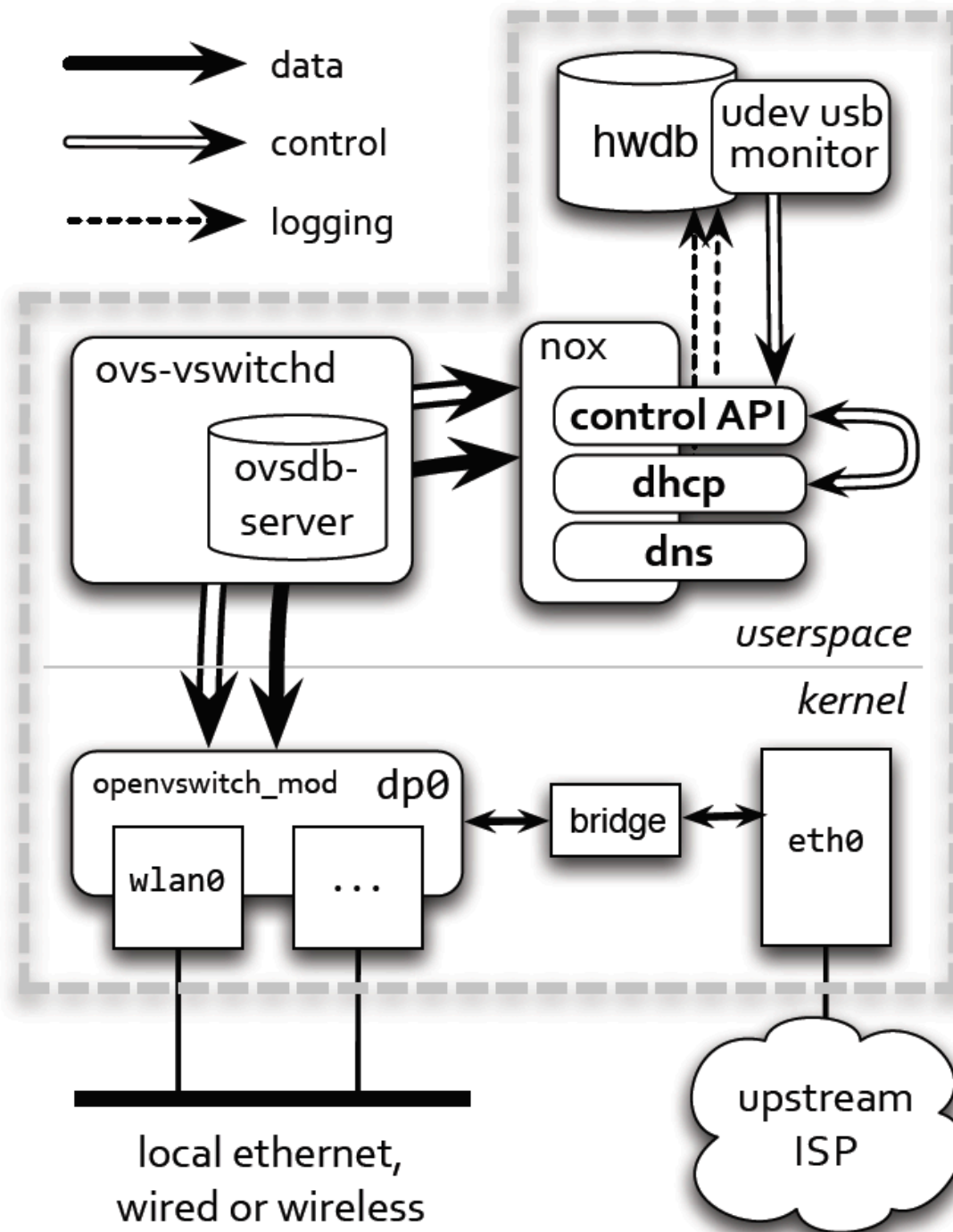
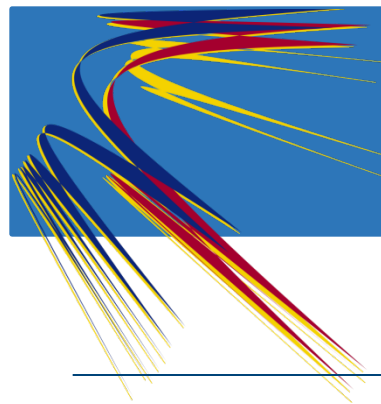
The Infrastructure Challenge (1)

- Monitoring consumption
 - Mechanisms to capture usage information at an appropriate level of abstraction
 - Techniques to make measured traffic more readily available to the user
- Performance and activity
 - Mechanisms to allow real time flow monitoring and alert users of these issues as they occur



The Infrastructure Challenge (2)

- Prioritization
 - Mechanisms to prioritize and control traffic associated with different devices and activities in real time
 - Human situated judgment is essential and users need to be linked to these mechanisms
- Policing the network
 - Lightweight mechanisms to manage how people get on and off a network, and what exactly they may or may not do when on the network

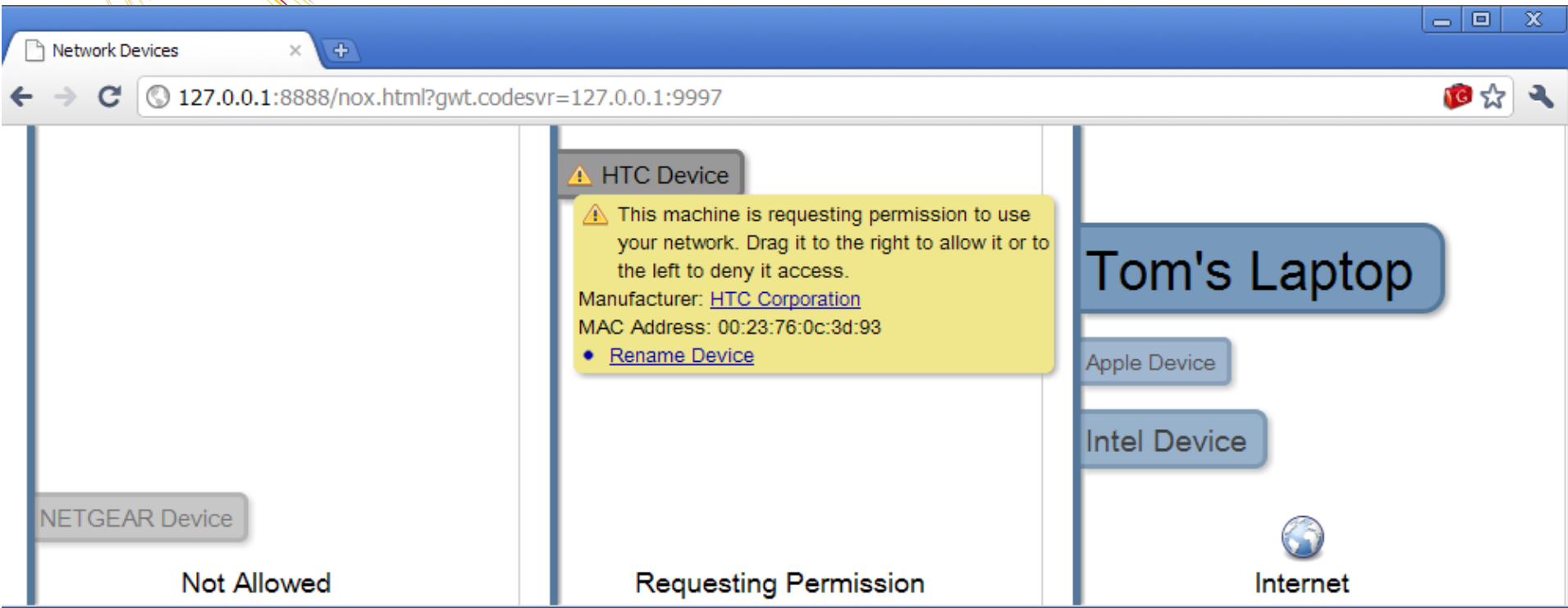




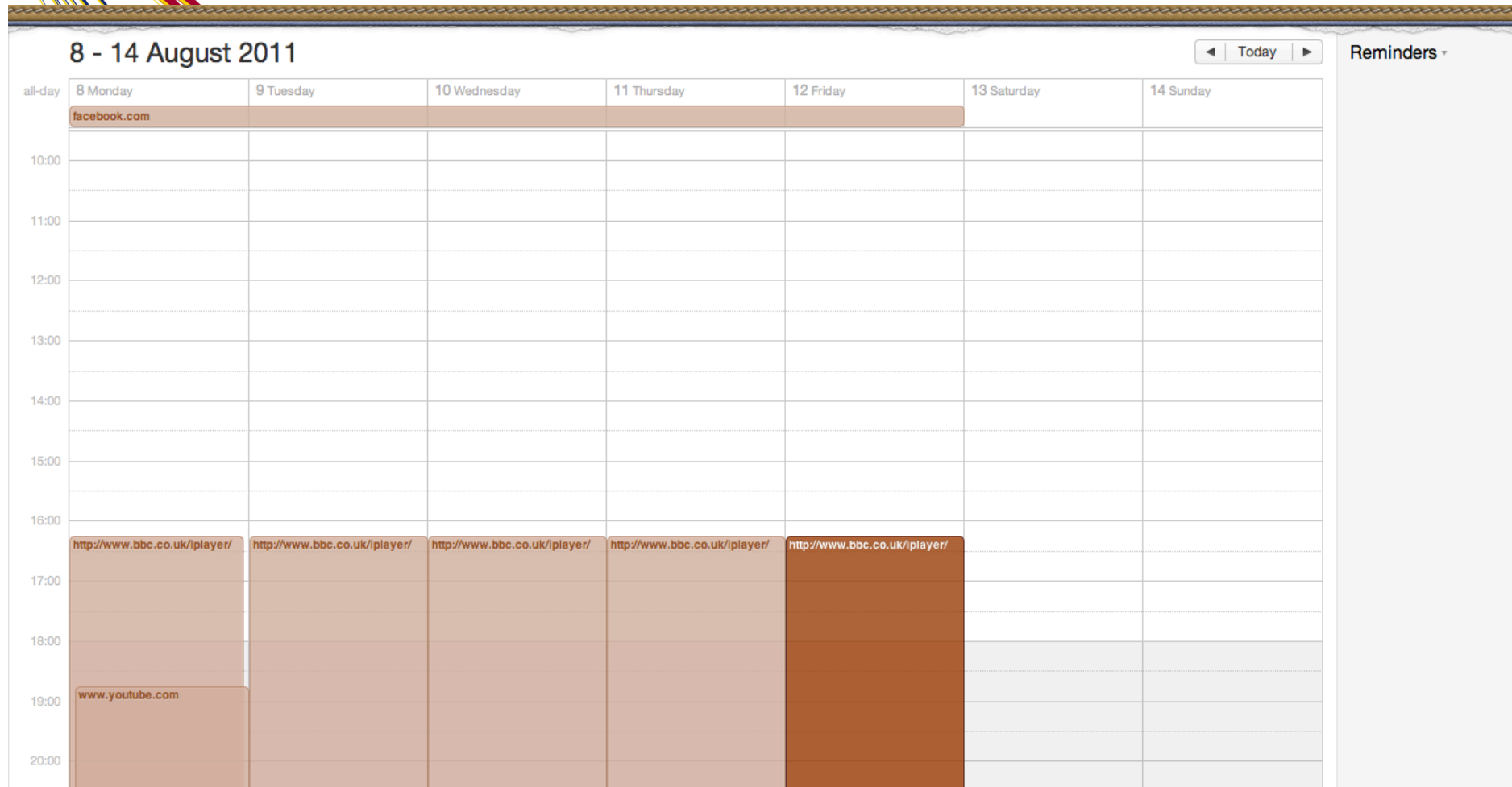
Interaction in the Infrastructure

- ***Putting people in the protocol*** by embedding user interaction in existing infrastructure protocols
 - Amending DHCP to involve the user in granting leases
- ***Bringing services closer to users*** by allowing greater control and configuration
 - Running a local DNS service that can access greater contextual information
- ***Exploiting the physical arrangement of the home*** by manifesting the infrastructure in the home
 - Using physical plug in tokens (USB keys) to manage access to the infrastructure and encode permissions

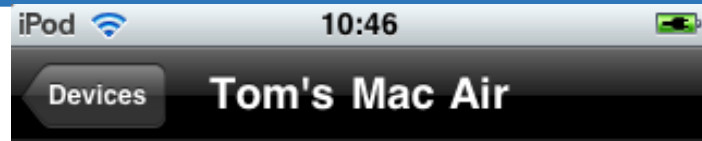
People in the Protocol



Controlling Localised Service



Contention Monitor



Tom's Mac Air



Kevins Laptop



SqueezeboxController



Devices

Programs

macromedia-fcs



http-alt



imaps

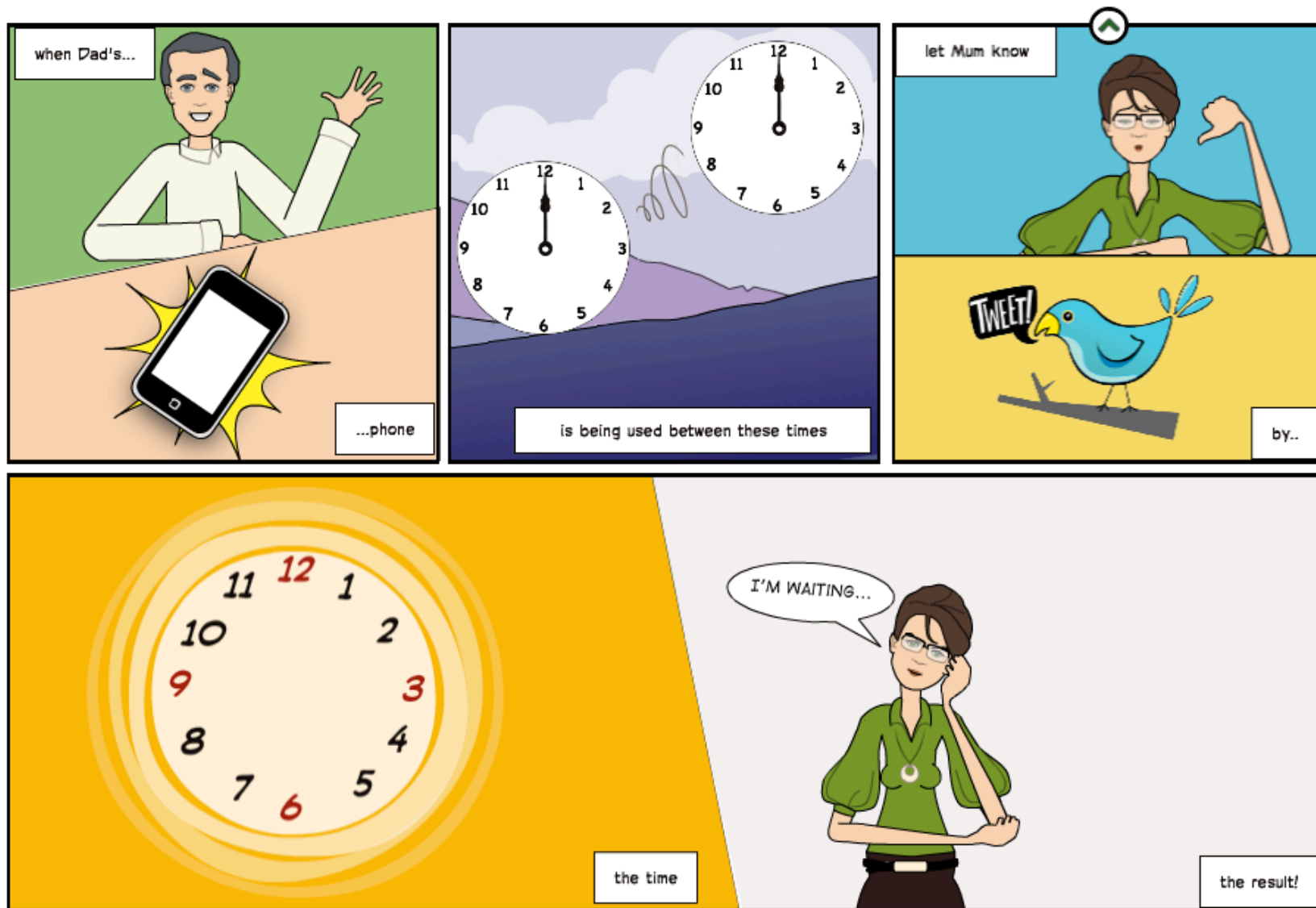


Devices

Programs

Physical Displays







Fundamental Challenges

- Home networks have become mundane
 - Another channel through which everyday life happens
 - Really no longer special
- But the (software) technology has not made this leap!
 - Still managed in terms of protocols and services
 - *Shopping*, not *the web*, not *HTTP*
 - The user doesn't draw a distinction between service (name resolution) and the network (IP forwarding)
- To do better we need the enabling technologies to allow these top-to-bottom connections to be made
 - Making the network *intelligible* (**not** intelligent)



Reflecting Broadly

- Designing to meet these challenges needs *multiple skillsets*
 - Ethnography, HCI, Systems, Networking, ...
- This requires *greater dialogue* between communities
 - Just throwing results over the fence *doesn't work*
 - Engineers must know about ethnography (a bit)
 - Ethnographers must know about technology (a bit)
- Else we will continue to make useless things
 - By imposing ridiculous demands, or
 - By implementing unusable/inappropriate technology



Questions?

- www.homenetwork.ac.uk
- (Other things I'm doing:
 - <http://perscon.net/>
 - <http://openmirage.org/>
 - <http://horizon.ac.uk/>)