

Ubiquitous Networking for Human Containers

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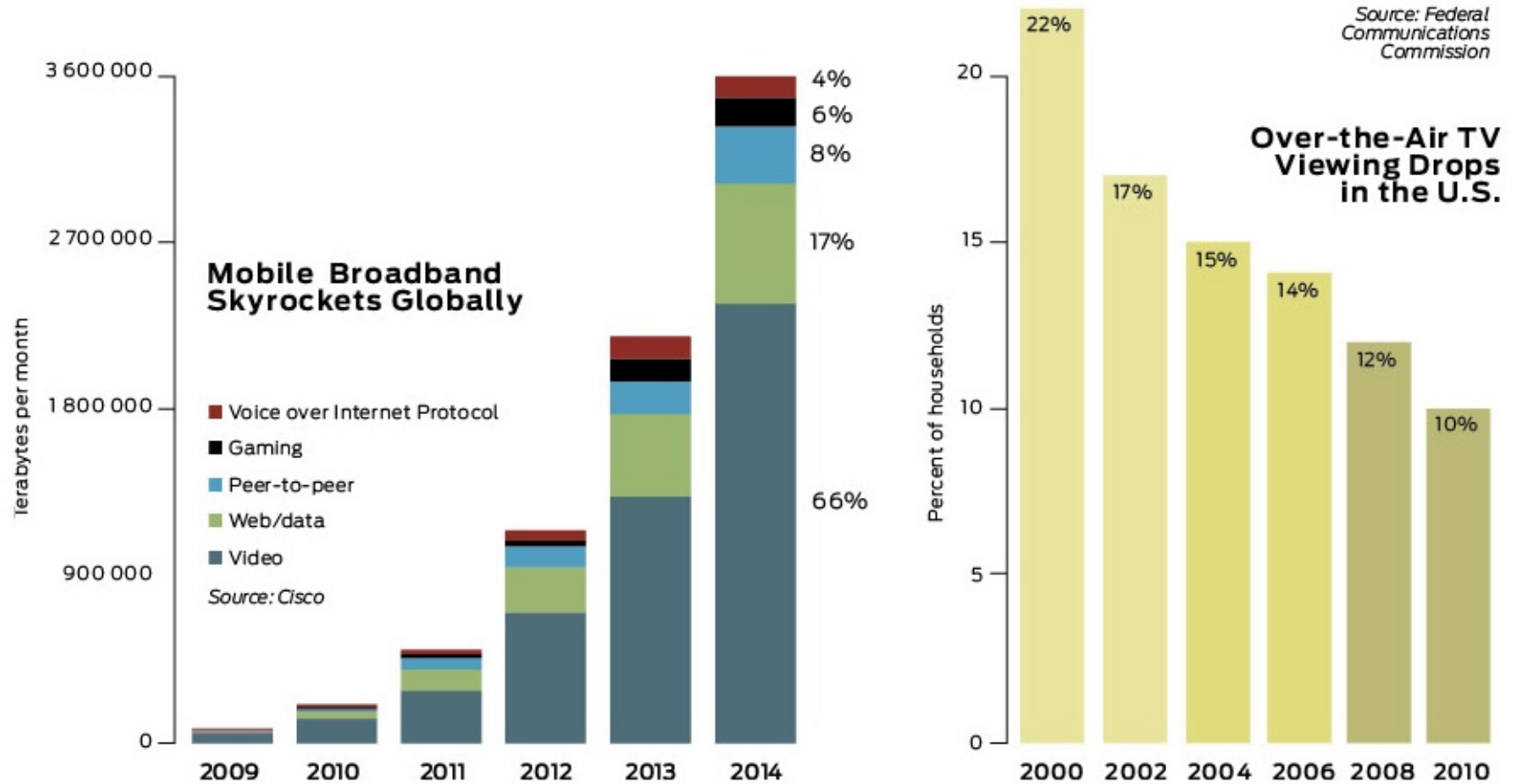
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What if the (wireless) Network Were Always There?

- Don't we have this today? Yes and no
- What's missing? Availability, latency, reliability, coverage, others...
- How can we achieve 'always there'?

Wireless Access Skyrockets



CHANGING TASTES: The amount of data being sent wirelessly over the Internet has shot up globally [left], while the small fraction of television-owning households that rely on over-the-air broadcasts has been steadily diminishing in the United States [right].

We Increasingly Live in Containers

- Offices, conference rooms, plane cabins, cars, etc.
- Many health, safety, productivity goals here (air, temperature, light, food, human interaction)
- Place where we deliver utilities (water, electric, gas)
- Most mobile access from home or work (indoors)

Image from http://www.comcare.gov.au/virtual_workplaces/virtual_office



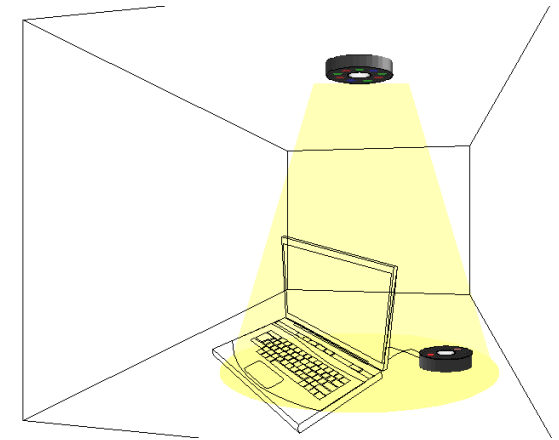
What if we embedded the network into lighting?

Piggyback
Lighting,
Control, and
Wireless
Access

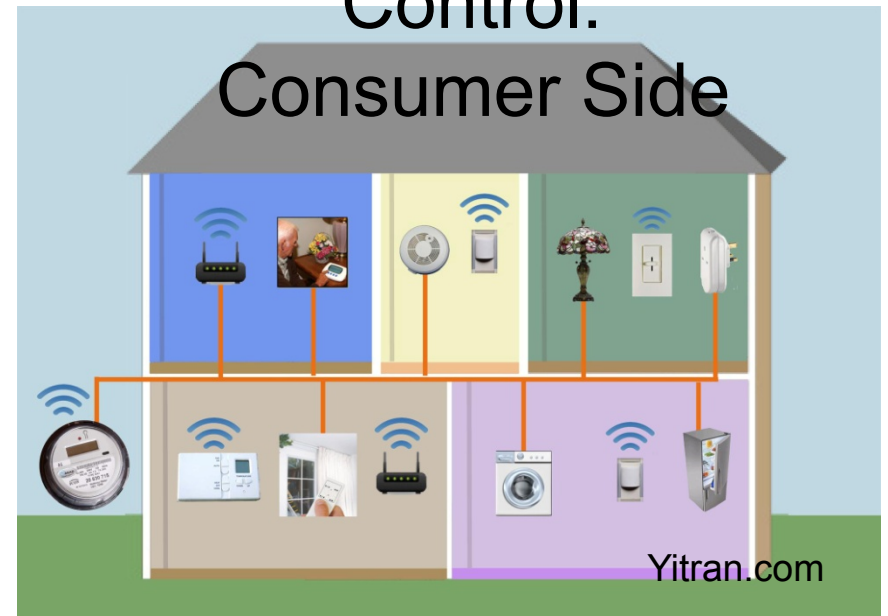
LED Lighting



Nexus.com



Smart Grid Device
Control:
Consumer Side



Yitran.com

Wireless Femtocell
Networking



From: How Stuff Works

Impact

- Indoor-spaces become **first-class destinations** for devices, data, and their interconnection
- Initiatives that **exploit locality**, especially transmission power control, spectrum reuse, and adaptation of cognitive radio will be ideal for these containers,
- Wireless channel **bottlenecks** that exist today will be mitigated
- Opportunity to support a wide range of pervasive devices operating at different energy levels and capability supporting a rich **new set of use cases** and applications.

Does it Work? Yes

- 40+ units to date
- 2 Mb/s bidirectional
- 400 lumens/unit
- Cells approx 1m diameter
- Arranged in 8 unit array
- Interfacing for mobility, multiple access, smart room control

