

Wireless Networks 2010

“2004 is the year of the mote”

-David Culler

“It takes 11 years from lab to product/industry.”

-Carver Mead

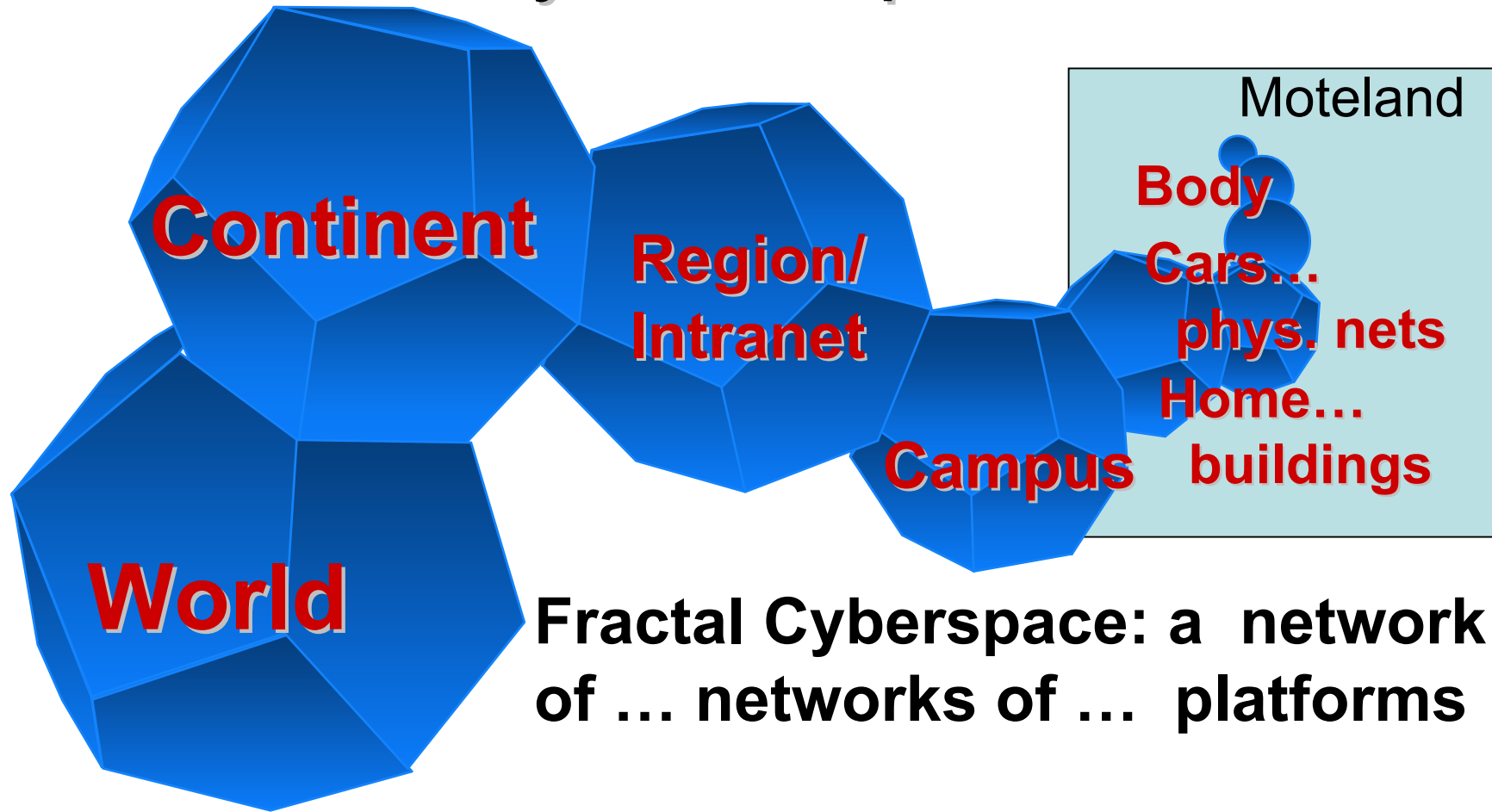
Gordon Bell

www.research.microsoft.com/~gbell

Microsoft Research

15 January 2004

Everything cyberizable will be in
Cyberspace and covered by a
hierarchy of computers!





Bell's law of computer class formation to cover Cyberspace

- New *much lower cost* computer platforms emerge based on chip density & other fundamental hardware phenomena
- **Computer classes require new platforms, networks, and cyberization**
- New apps and content develop around each new class
- Each class usually becomes a vertically disintegrated industry based on hardware and software standards
AFTER IT FLAILS for 5-10 YEARS

“Belden files chapter 11”

“With the reduction in the wires and cables industry, Belden filed for chapter 11 after three years of declining sales and no prospects for this market.

Ember technology (Nasdaq EMBR, market cap \$100B...more than the value of GE and GM) supplies the technology that enables the elimination of cables and other networking in virtually all homes, hospitals, commercial and industrial buildings, automobiles, highways and other physical networks, aircraft, and most recently, the human body. Ember is being investigated as a monopoly based on Cisco’s filing with the justice department.”

“25 Billion dollar notes industry enables 25 billion dollar theft industry”



Install fake card reader. Install “pin capture” camera.
... and then just harvest the bits.

Mote Classes 2004

- Sensors/actuators include RFID, GPS, still and video cameras, plus all environmental & bio-sensors
- Classes separate into fixed & moveable apps
- Three separate scale motes based on Si/power/bps
 - Mini-mote = c2004 mote @1/100 power, energy harvesting, available as core cells with radio; TinyOS 3.2
 - Mote = 16X memory; 1/10 power of c2004 mote running TinyOS++; higher bandwidth (e.g. used for speaker cable, rooms that record everything they hear and see).
IP based to enable end-to-end?
 - Mega-mote running Linux & embedded XP

The end