

Moving Beyond One-Off

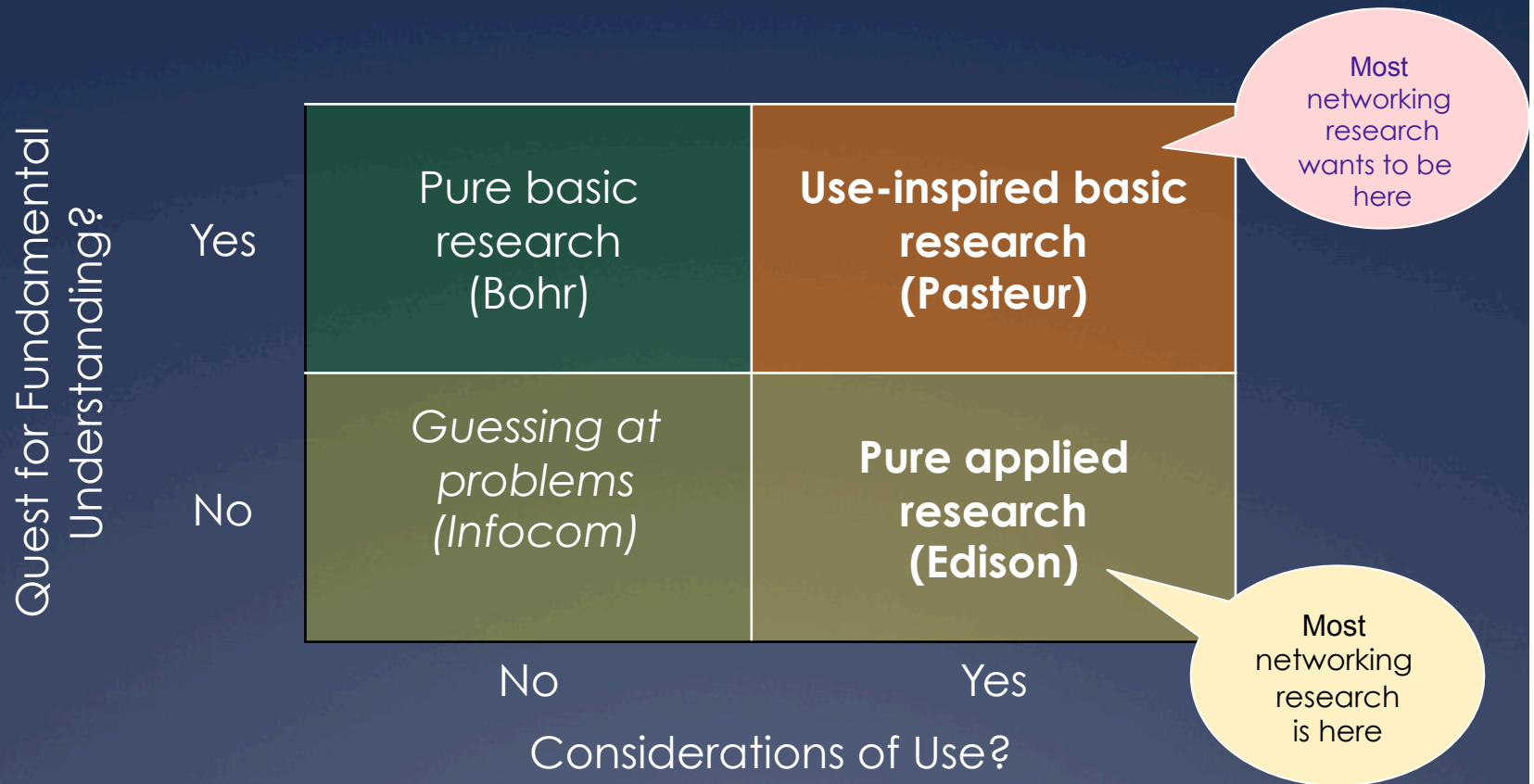
Ubiquitous Applications

Henning Schulzrinne
Columbia U/U of Oulu

My assumptions

- * We're an **engineering** discipline
 - * “Engineering is the discipline, art and profession of acquiring and applying technical, scientific, and mathematical knowledge to design and implement materials, structures, machines, devices, systems, and processes that safely realize a desired objective or invention.”
- * Other (good) possibilities:
 - * we train future engineers
 - * we train future researchers

Pasteur's quadrant



The \$1 B question

- * How big a problem does your proposal solve?
 - * Does it create new ones?
 - * financial, management, ...
- * Can it be integrated into the existing Internet
 - * or a plausible successor?
 - * or 802.11, 802.16, ...
- * ... without everybody changing their ways
 - * the secret: **nobody** is in charge of the Internet
- * Can it be understood by Cisco CNAs?
 - * see IP multicast, PIM-SM

Useful research outcomes

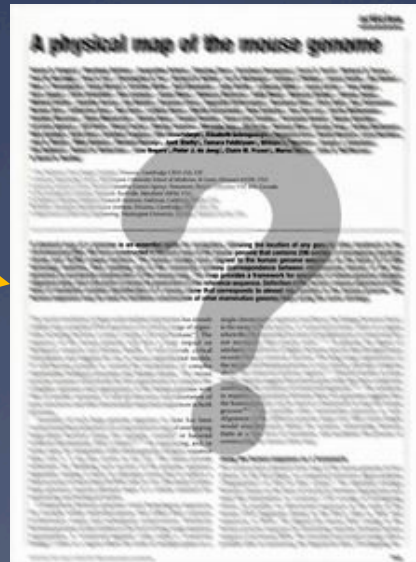
- * Standards
 - * unfortunately, rarely cite papers
- * Get Cisco, Google, Microsoft, ... to adopt it
 - * 3-4 QoS papers?
- * Show what doesn't work
 - * counteract industry skills
 - * e.g., recently web site privacy
- * Understand the Internet better
 - * but not just your campus network
- * Prior art in patent disputes
 - * patents don't have a 90% rejection rate...

CS research to reality

CS as science

CS as engineering

CS as a soccer league



PAMELA EVANS
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PROFILE

- Award-winning, multilingual Business Student with extensive professional and entrepreneurial experience.
- Awarded 2001 Student Leader for exemplary service in student government.
- Received 2001 Service Award for outstanding contributions to campus activities.
- Fluency in English, Spanish, and Portuguese. Technically proficient in MS Word, Excel, and PowerPoint; programming in Visual Basic and HTML; Web design.

EXPERIENCE

TRANSLATOR, Orange County, California
Freelance Contractor 4/03- Present

- Team with two secretarial assistants to provide conversation-based translation and mediation services to non-English speaking business owners and employees.
- *Accomplishment:*
- Awarded Hispanic Business Community recognition for assisting immigrants.

TRIMVY, LLC, Santa Ana, California
Foreign Currency Trader, Intern 12/01 - 2/02

- Handled \$50,000+ monthly in trade and investment, specializing in Euro, Dollar, and Yen transactions; investigated trends and issued market reports.
- *Accomplishment:*
- Increased profitability by exploiting Euro-to-Dollar exchange rate fluctuations.

CHILDREN'S LEARNING CENTER, Fullerton, California
Founder / Business Manager 6/00-8/01

- Established and operated an educational institution with a staff of 20.
- *Accomplishment:*
- Built revenues through direct student recruitment and cooperative local network.

PREMIER LEARNING ACADEMY, Irvine, California
Assistant Business Manager / Spanish Tutor 12/99-3/00

- Aided management and coached students for educational preparation institute.
- *Accomplishment:*
- Succeeded student enrollment; won Employee of the Month Award.

SEDA Y FIBRAS, S.R.L., Hernandez, Alto Parana, Paraguay
Assistant Business Translator 2/97-12/98

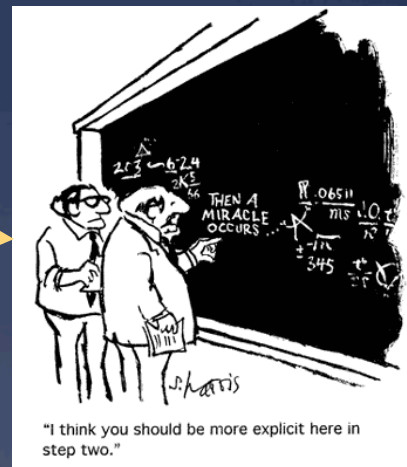
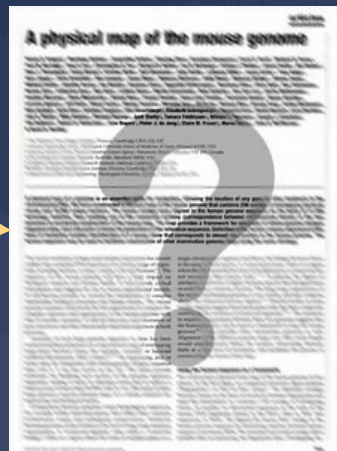
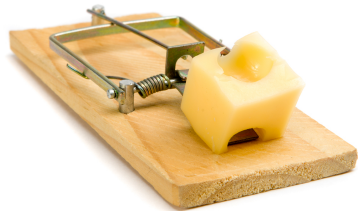
- Checked English-Spanish-Portuguese translation of business documents and person-to-person conversations for global textile exporter.

EDUCATION & ACTIVITIES

CALIFORNIA COMMUNITY COLLEGE, Irvine, California
Business Administration Major, 2000 - Present

- 4.00 GPA, President's List, Alpha Gamma Sigma, Phi Alpha Mu, Mu Alpha Theta.
- 2001 Associated Board of Trustees Member.
- Student Representative to Academic Senate, Spring 2001.
- Student Representative to Transfer Advisory Board, Spring 2001.
- Student Advisor to Business Club, Fall 2001.

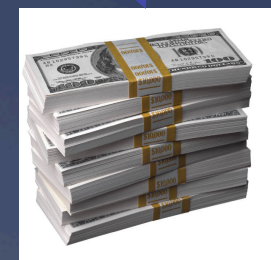
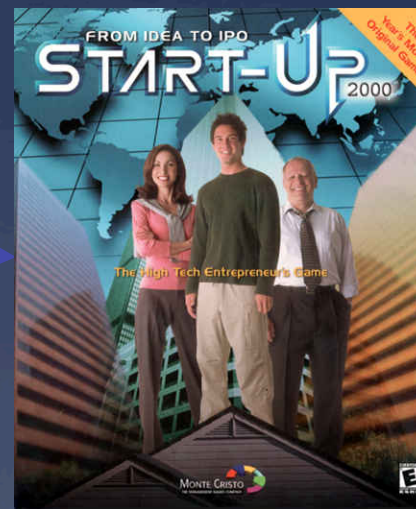
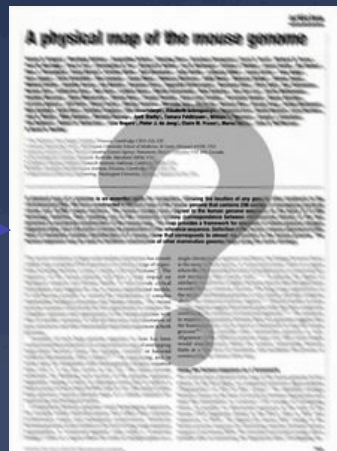
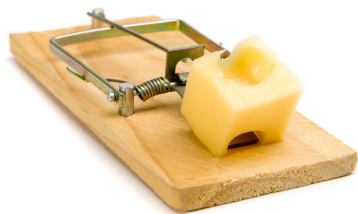
Network tech transfer, mode 1



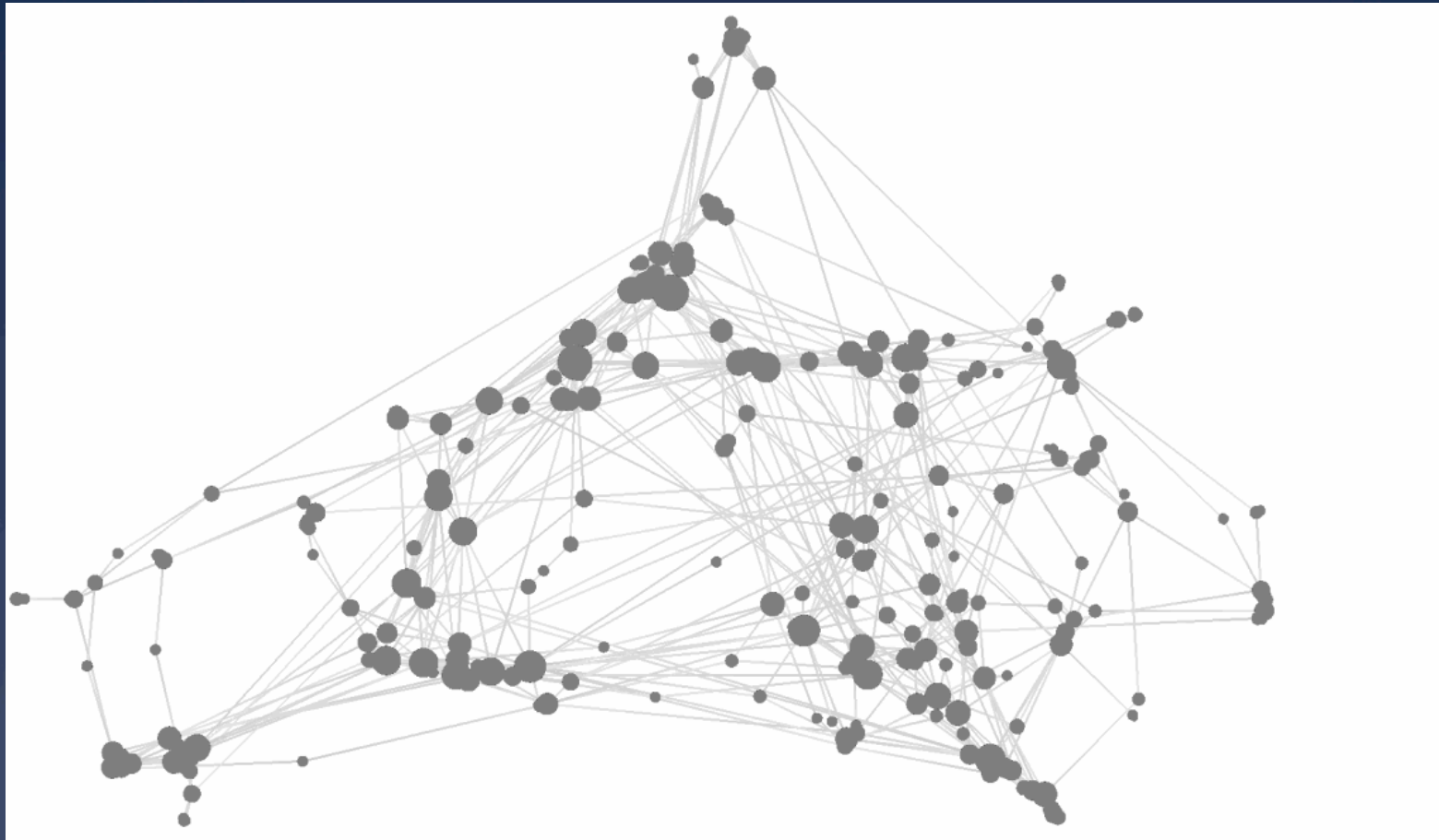
CeBIT

somebody else just waiting for your results

Network tech transfer, mode 2



Or just measure citations



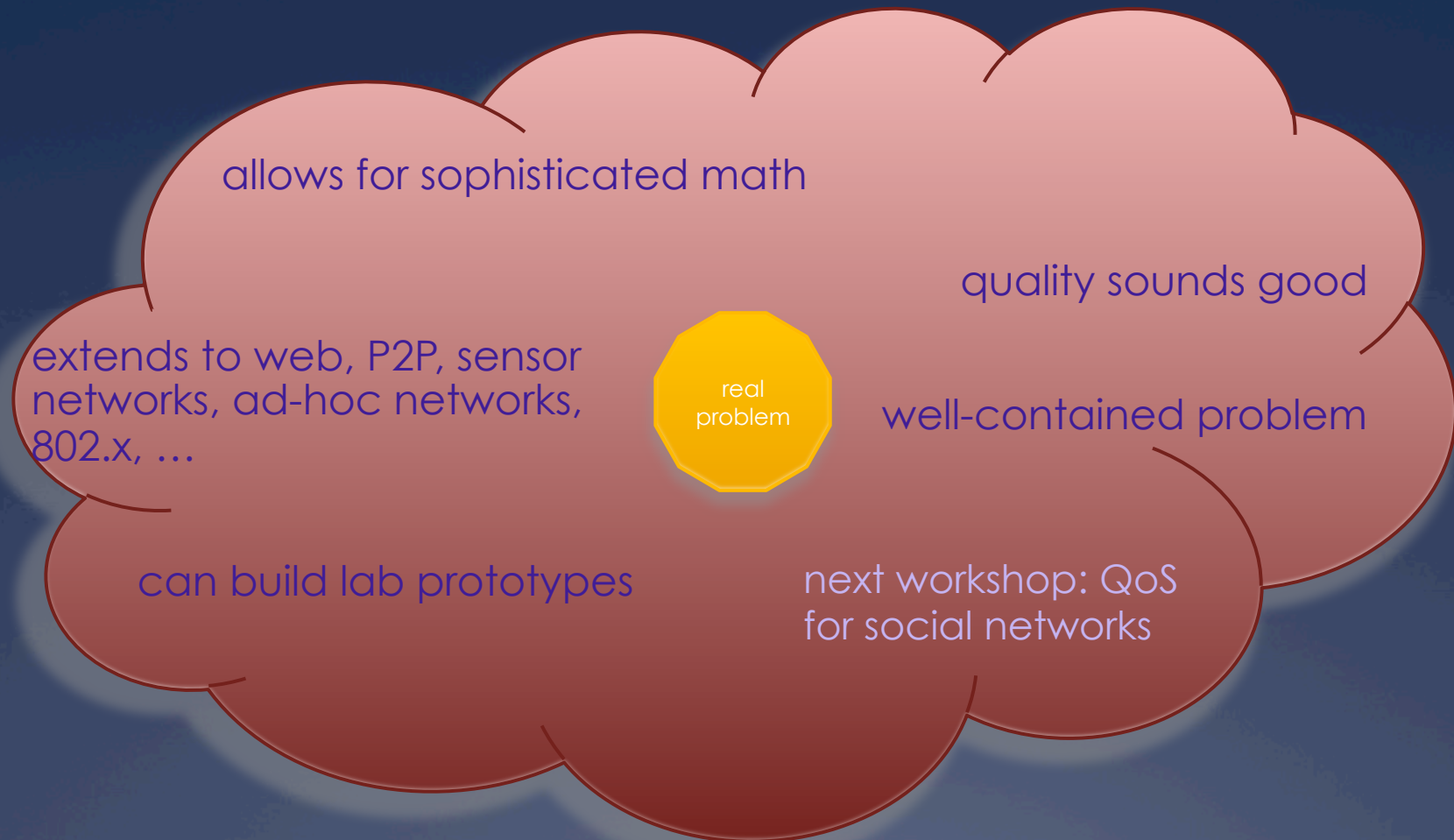
be sure to create enough conferences and workshops...

WWIC 2010 & I4QoS 2010

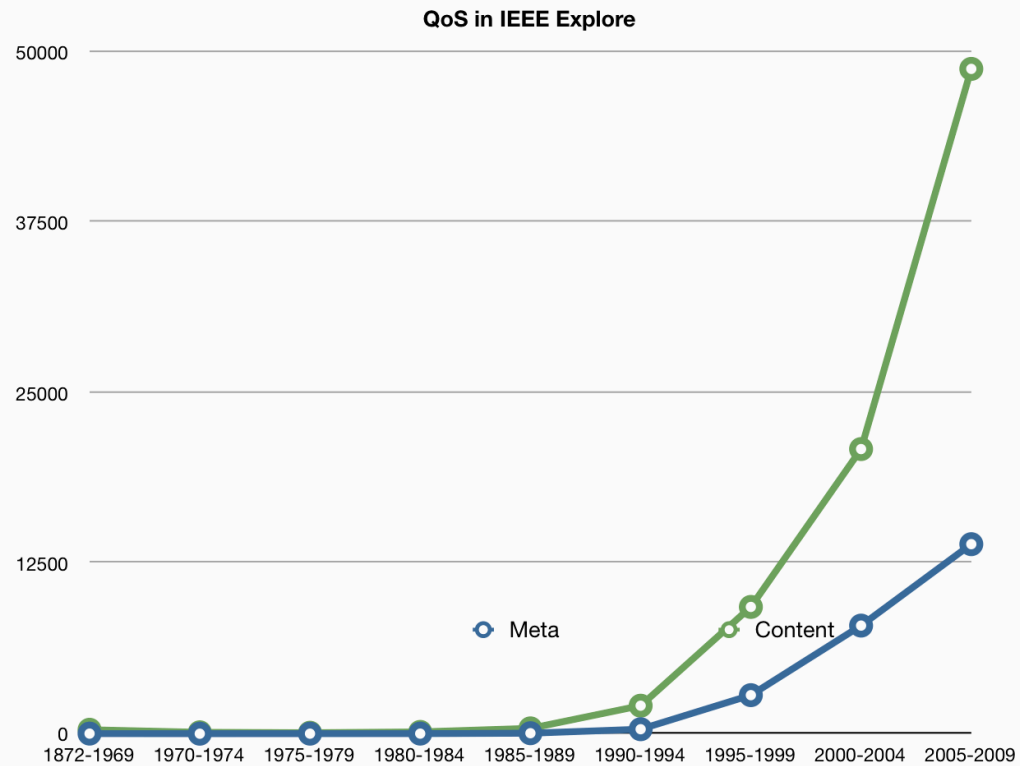
Caricature UbiComp application

- * Installed on some set of mobile devices or local infrastructure
 - * usually stand-alone
- * Solves a (minor) problem familiar to the researcher
 - * typically young, technically-focused
 - * social interaction, searching, games, ...
- * Tested with < 10 users
- * Disappears after the conference paper has been published
 - * and nobody misses it 😊

Why is QoS attractive?



QoS research activity



QoS research

- * IEEE: 25,583 papers with “QoS” in metadata through 5/2010
 - * 84,257 with QoS in meta data or text
- * 2 papers/PhD year
- * \$50,000/PhD year
- * → \$640M in QoS research

Reflective research needed

- * Which applications (and tools) from the UbiComp community have had lasting impact?
 - * Some may have inspired other, at-scale applications
 - * But did these applications really draw on the paper?

Questions


- * “Just apps”?
 - * leave to professional app developers – scale, refinement, maintenance
 - * but good educational opportunities
 - * student motivation, impact
 - * 2008: own web app → 2010: own mobile app
- * “Cute toys”
 - * need to scale beyond demo
 - * how do good ideas get picked up for scaling?
 - * real value – sustained use?
 - * business model
- * Infrastructure vs. carry-along
 - * scaling, initial and incremental deployment cost, sustainability

Adoption

 Enlarge This Image



Jamie Rector for The New York Times
For safety's sake, Marsha Collier checks in on Foursquare only when she is leaving a place.

 Enlarge This Image



Mark Schiefelbein for The New York Times
Elizabeth Aley scanning the bar code on laundry detergent to get points on Shopkick.


But while a home on the beach will always be an easy sell, it may be more difficult to persuade people to start using location-based Web services.


Big companies and start-ups alike — including [Google](#), Foursquare, Gowalla, Shopkick and most recently [Facebook](#) — offer services that let people report their physical location online, so they can connect with friends or receive coupons.

Venture capitalists have poured \$115 million into location start-ups since last year, according to the National Venture Capital Association, and companies like [Starbucks](#) and Gap have offered special deals to users of such services who visited their stores.

But for all the attention and money these apps and Web sites are getting, adoption has so far been largely confined to pockets of young, technically adept urbanites. Just 4 percent of Americans have tried location-based services, and 1 percent use them weekly, according to [Forrester Research](#). Eighty percent of those who have tried them are men, and 70 percent are between 19 and 35.


RECOMMEND

 E-MAIL

 SEND TO PHONE

 PRINT

 REPRINTS

 SHARE



Scaling UbiComp

“Proof of concept”

- software (kind of) works
- 10 users
- no content model
- single domain
- no privacy & security model
- no business model
- “cool demo”

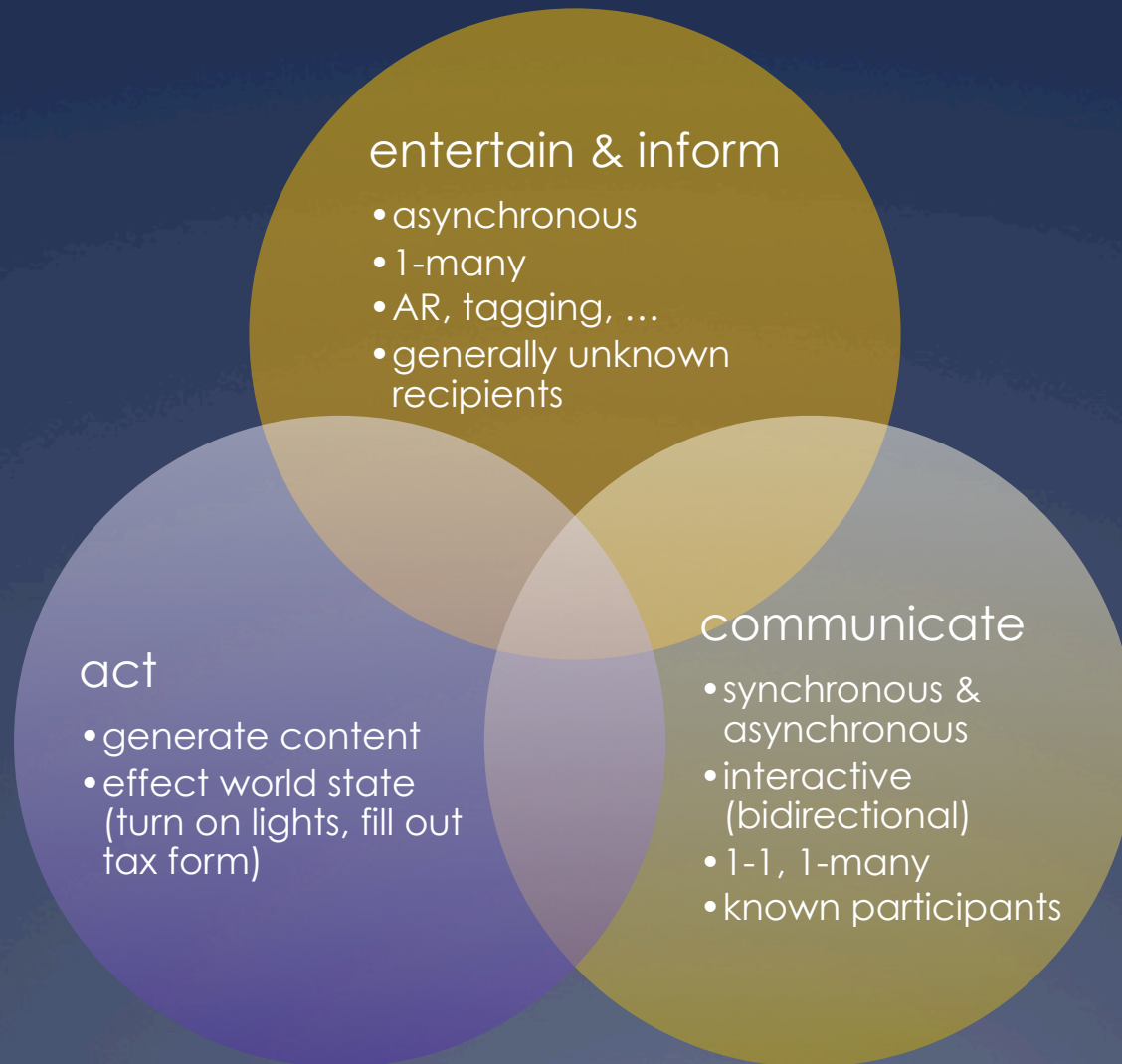
Scalable applications

- robust, managed
- 10^6 users
- content generation & maintenance
- can be easily customized to different communities
- financial sustainability
- “hot application”

Content

- * Little content → little usage
- * Part of scalable design
- * Kinds:
 - * self-generated (sensors, derived content)
 - * user-generated
 - * validation, policing, ...?
 - * custom-generated

3 broad areas



CS = tool builders

- * What would make building applications easier, faster, more reliable?
 - * management (cf. PanOulu displays)
 - * image processing?
 - * disruption-prone computing
 - * autonomous scaling to millions of users
 - * ?

Grand (?) challenges

- * What societal problems can UbiComp address?
 - * health care (cost, availability, effectiveness)
 - * educational challenges
 - * safety (vehicles)
 - * social and civic engagement
 - * limited gov't resources
 - * “emerging economies” problems