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# The Internet: Imagination, Innovation or Imitation?

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tec - 1

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## Definitions

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- ◆ The Internet
  - network of networks running TCP/IP
- ◆ imagination
  - the ability to confront and deal with reality by using the creative power of the mind
  - also: an unrealistic idea or notion
- ◆ innovation
  - the act of introducing something new
- ◆ imitation
  - something derived or copied from an original

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# The Internet

(not an internet)

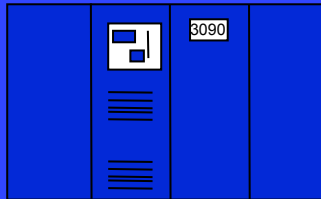
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## What was the Internet?



or



Dest Addr	Src Addr	payload
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- 0/ multiplexed utilization of **existing** networks
- 1/ **survivability** in the face of failure
- 2/ support **multiple types** of communications service
- 3/ accommodate a **variety** of network types
- 4/ permit **distributed management** of resources
- 5/ **cost effective**
- 6/ **low effort** to attach a host
- 7/ **account** for use of resources

**!security**  
**!Qos**  
**!efficiency**

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e2e!

tec - 5

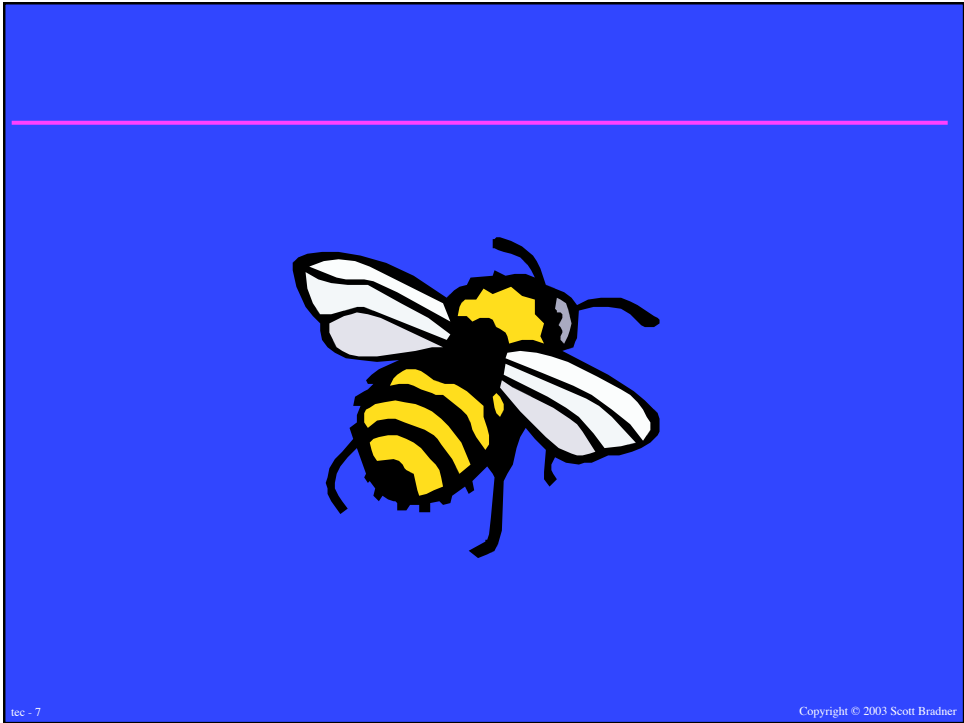
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What did **They** think the Internet was?

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## Today's Internet



## Potential Importance of the Internet

◆ who said this about what?

“The invention of [...] is the greatest event in history. It is the mother of revolution.”

“In its [...] form, thought is more imperishable than ever; it is volatile, irresistible, indestructible. It is mingled with the air. ... Now it converts itself into a flock of birds, scatters itself to the four winds, and occupies all points of air and space at once.”

“A [...] is so soon made, costs so little, and can go so far! How can it surprise us that all human thought flows in this channel? ”

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# But

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but will imitation live up the potential?

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## Internet Applications

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- ◆ web
- ◆ mail (increasingly a.k.a spam), FAX, IM
- ◆ remote login
- ◆ data transfer, storage
- ◆ commerce
- ◆ audio & video
- ◆ search
- ◆ content

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## Simply Engineering?

### ◆ 2000 PBS American Experience show on “1900”

"The turn of the century, particularly in America, represented a period that will someday be compared to the Renaissance. Within a period of very short time, 15-20 years, most of the breakthroughs in technology occurred that now influence our lives so heavily. Everything since then has been engineering. You capture motion. Motion picture comes about this time. Now everything since is engineering. It's technology. Sure, the picture's better, but the idea of seeing people move on a screen is new. The telephone. "Hello? I'm talking to Chicago." A miracle. But we take it for granted. You break through and record sound. It's gotten better, but everything since is **simply engineering.**"

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## Internet New (since 1900) Applications

### ◆ **web**

◆ mail (increasingly a.k.a spam), FAX, **IM**

### ◆ **remote login**

◆ data transfer, storage

◆ commerce

◆ audio & video

◆ search

◆ content

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## “Big” Applications on Cell Phones

- ◆ on a revenue per minute basis

- 1/ ring tones

- 2/ IM

- ...

- N/ voice



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## How New is the PC?

- ◆ XEROX PARC ~1973

- gui

- windows

- wysiwyg editing

- mouse (from Bob Engelbart)

- trash can

- laser printer

- data networking

- ◆ what since then is not “simply engineering”?



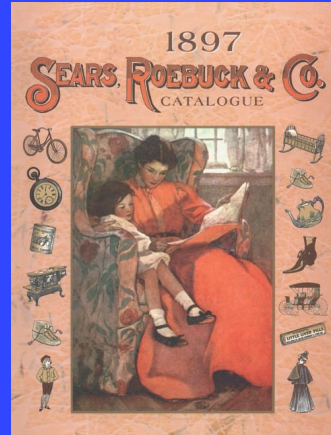
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## How Important is the E?

- ◆ how much in e-commerce is new?  
i.e., not just Sears, Roebuck & Co. with near-instant gratification & better indexes
- ◆ is moving a postal-based system to the Internet innovative?
- ◆ reengineering business flows can sometimes be innovative but is that The Internet's fault?



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## Imitation

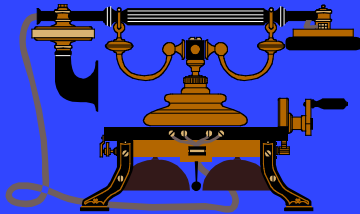
- ◆ good for learning
- ◆ but one needs to move beyond



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## IP Telephony or Internet Telephony?



voice

IP

or

IP

“make sure it stays good”

“it is good enough”

ITU & others want to “define” voice over IP  
but no way to know what it **will** be

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## E.G., SIP

### ◆ to begin with

send invitation with session description  
initiate media stream(s)



### ◆ since then

simulate increasing number of PSTN features  
e.g., Nortel Centrix feature library has >70 features  
how many are actually needed vs. how many do managers  
& pundits say are needed?



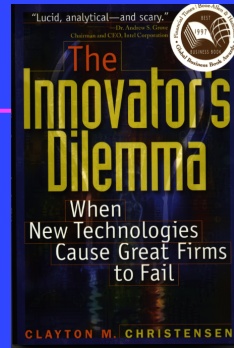
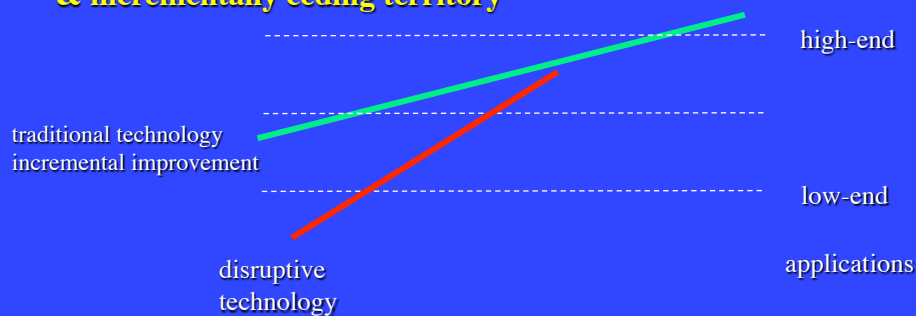
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## IP Storage

- ◆ Innovator's Dilemma personified?
- ◆ imitative and disruptive
- ◆ but is it actually innovative?

**building yesterday's product better  
& incrementally ceding territory**



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## “New” Networks

- ◆ Sprint conversion to ‘packet’ technology  
(the quotes were in the Nortel 2001 press release)
- ◆ Verizon, SBC and BellSouth FTTH
- ◆ MCI “we are moving everything over onto IP”  
near term separate from UUNET, later combined

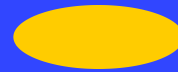


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## What Would Be Innovative?

- ◆ how about Internet Telephony
- ◆ with
  - smart voice terminals
  - downloadable applications
  - open** to the Internet
  - standard open protocols
- ◆ actually this is not innovation
- but would (does) enable innovation



**MODE**



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## But

But who is going to make money on **that**?

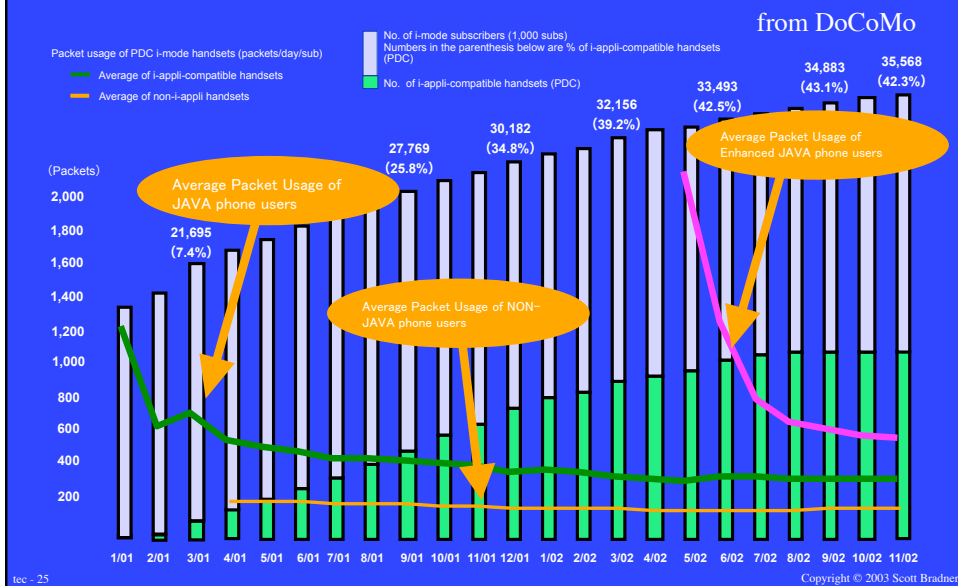
John McQuillan

(i.e., is there a business model for the Internet as Internet?)

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## Packet Usage (for some wireless?)



## Next Time? (or is it now?)

support existing networks

**datagram**-based

creating the **router** function

split TCP **and** IP

DARPA fund Berkeley to add TCP/IP to **UNIX**

CSNET and **CSNET/ARPANET** deal

NSF **require TCP/IP** on NSFnet

ISO **turn down** TCP/IP

NSF Acceptable Use Policy (**AUP**)

**minimal** regulation

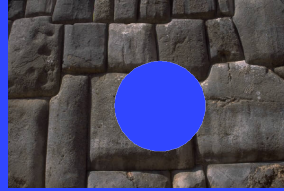
**10 decisions that made a difference**

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## Current Decisions

- ◆ path openness
- ◆ standards?
- ◆ security
- ◆ privacy
- ◆ business model
- ◆ regulations



or



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it is **NOW**  
(and it is us)

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