Infostation Update

- Origins: faster, cheaper bits
- Current focus: much faster, much cheaper bits

Comparison to Cellular
- Design and cost
- Bit rate and spectrum
- Spectrum cost and efficiency

Service costs; flat rate services

R. Frenkiel 5/4/00
Origins- IAB Fall '95

- Reduce Power?
- Increase Interference?
- Increase throughput?

“EXCESS S/I”
(S/I exceeds design criteria for service)
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EXCESS S/I
“Infostations”

- Isolated small areas can use high bandwidth
- Positioned for user access (building entrance, tollbooth)
- Coordinated with narrow band “backbone”?
Can Cellular deliver the bits?

- Costs coming down
- Bit rates going up (2.5G and 3G)

- Cellular bits will still be too slow and expensive for new applications
- Infostations can offer “unlimited” flat rate service, driving new applications
Cellular Design & Costs

- Voice coverage (anytime/anywhere)
- Sites placed for Uniformity; Coverage
- High probability of low bit rate
- Limited BW per user; multiple access
- Interference limited; spectrum limited
- Diverting spectrum increases voice cost

SYSTEM DESIGN YIELDS HIGH COST PER BIT
Reducing Cellular Cost/infobit

Higher bit rate (GPRS/EDGE; 3G)?

- Wait for “sweet spot”?
- More bits/sec than voice, with delay
- Less coding (x2?)
- m-ary constellation (x2-3?)
- Reuse at N=1?
- Higher bits rates through multiple voice channels doesn’t reduce cost/bit
Cellular Bit-rates

- 10 Kb / sec for voice
- 50 Kb / sec / voice channel in sweet spot?
- Low probability of very high s/i + N=1
- Higher rates imply multiple voice channels
- Marginal for e-mail; voice mail; current web
- Limits new applications (image, music, etc.)
- Limits cost reduction per bit
Infostation design & costs

- Infostation placement is critical
  - high probability of short path ("bottlenecks")
  - low power
- Single "LAN- type" Radio
- Simple operation (no handoff; limited coordination)
- Simple sites; installation
- Network costs?
  - Local and multi-user information?
  - Low Infostation occupancy?
Infostation- Gigabit / sec rate?

- S/N adequate at short range
- Need one, very wide channel (100MHz +)
- As much spectrum as cellular, but:
  - Can use very high frequencies (5, 30, 60 GHz)
  - Can share with other users (coverage; occupancy; delay)
- High spectrum efficiency
  - bits / MHz / sq mi? (cellular)
  - Bits / watt-sec? (shared spectrum)
Infostation- cost per bit

- Reduced cost per base
- Higher bit-rate per base
- Lower spectrum cost
- (but) Lower occupancy

- Dramatic reductions in cost are possible
- Demand is the key
- Flat rate unlimited service is the path
Infostation- cost per bit

- Based on a “back of the envelope” calculation, a flat rate of $5-10 / month can provide “unlimited” bits with a minute or two of delay

- Entertainment, image, location dependent and currently unknown information applications will emerge based on “unlimited, free bits”