Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: Aloha to the Web
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Abstract: In June 1971 the first two way wireless transmission of data packets within a computer network was put into operation in the ALOHA Network at the Manoa campus of the University of Hawaii in Honolulu. The ALOHA protocol developed in that project has since formed the basis of almost all wireless and many wired random access MAC protocols. Ethernet, WiFi, a wide variety of CSMA based protocols, DOCSIS and four generations of cellular standards trace the origins of their MAC protocols back to the ALOHA Network.

Purpose: To focus activities during the meeting
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SUMMARY

1. The history of ALOHA
2. ALOHA applications
3. The ALOHA channel
4. Current issues in ALOHA
THE HISTORY OF ALOHA

Hawaii

Honolulu

1968
THE ALOHANET

AT-1

INTELSAT IV

packet repeaters

packet sensors

terminals

IBM 370/158

HP 2100

MODEM

SIMP

TR

multiplexor

PCU

PCU

PCU

PCU

MPLX

MINI
THE ALOHANET

IBM 370/158

HP 2100

PCU

PCU

PCU

PCU

Terminals

1976
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ALOHA APPLICATIONS

- satellite networks
- Ethernet / DOCSIS
- WiFi
- wireless mobile
SATELLITE ALOHA

Marisat 1976
private networks 1980’s
Internet access 2000’s
ETHERNET

• Alto ALOHA Network – Metcalfe ‘73
• CSMA/CD – Kleinrock / Tobagi ‘75
• Standards – IEEE 802.3 ‘83 ......

1973 1983 - 2011
WiFi

- unlicensed bands (Marcus / US) ‘85
- CSMA/CA – Kleinrock / Tobagi ‘75
- standards – IEEE 802.11 ‘97 ......

1995

EtherNet or ALOHANet ?
WiFi (Applications)
ALOHA in WIRELESS MOBILE

1980’s 1G
1990’s 2G
2000’s 3G
2010’s 4G ...

request control

* SMS
* GPRS
* web
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THE ALOHA CHANNEL

maximum throughput = \frac{1}{2e} = 0.186
ALOHA FLAVORS

- unslotted ALOHA
- slotted ALOHA
- reservation ALOHA
- CSMA
- spread ALOHA
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CURRENT ISSUES in ALOHA

• to slot or not to slot?
• spread ALOHA – CDMA w/o CD
• WiFi – EtherNet or ALOHANet?
• bursty traffic – charging by the byte
• throughput and protocol overhead
THE END
REFERENCES


HISTORICAL REFERENCES


