ALOHAnet: The World's First Wireless LAN

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Believe it or not, there was a time when communication between computers was done point-to-point, necessa[...] though a wired connection, by manual control. True, this would have been back around the time Richard Ni[...] appeared on "Laugh-In," but it did happen.

What changed this — or, at least, one of the developments that facilitated its change — occurred in [...] southernmost state in the United States: Hawaii.

In 1970, faculty at the University of Hawaii wanted to create a network to link computers at campuses that w[...] geographically far removed from one another. So they developed ALOHAnet, a computer networking system t[...] used radio transmitters as ports passing data from machine to machine.

As it was originally designed, ALOHAnet used two different radio frequencies to transmit data, with a hub mach[...] sending packets of data on the "outbound" channel and client machines sending data back to the hub on [...] "inbound" channel. Data received was immediately sent back, allowing client machines to know whether the d[...] had been received. A machine receiving back corrupted data would wait and resend the packet.

Data would be corrupted when it "collided" with other data, that is to say, two client machines had attempted [...] send data at the same time. ALOHAnet's main challenge was managing these collisions. Under its origi[...] configuration, the network had a throughput rate of just 18 percent, with a vast majority of the available bandwi[...] wasted.

The first attempt at a solution to this problem was to create time slots assigned to all the computers in the netwo[...] during which time they were allowed to send data packets, and others were not.

The flaw here was that if a certain machine on the network had nothing to send during its slot, that time [...] wasted. Nevertheless, this did double the throughput rate.

With the second attempt at a solution to this problem, the developers of ALOHAnet really hit on something. [...] idea was to have client machines on the network "listen" in on the channel to determine whether it was in use, [...] if it wasn't, begin sending data packets. To avoid one client machine getting on the frequency and staying on it [...] too long, thereby blocking other client machines trying to send packets, the data was broken into small packets [...] all machines on the network could share the channel continually.

The idea became known as carrier sense multiple access (CSMA), an innovation the developers of ALOHA turned around and improved by having client machines also listen to see whether their send packet made it back the central hub machine on the network.

This addressed problems that would arise if two client machines attempted to send a data packet at the same ti which could happen even with the machines having listened to see whether the channel was open.

This idea became known as collision detection (CD). Put it all together, and you have carrier sense multiple acc with collision detection (CSMA-CD).

The ALOHAnet is not in use anymore, but in fostering the development of CSMA-CD, it provided a sophistica network control protocol that proved to be a huge step forward in the development of the Ethernet. And prefigured many of the design characteristics of modern wireless LANs.