Lit Banjo; Keen Hoes:
a 6.033 Design Project

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Abstract—The outline goes here.

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1 HIGH LEVEL SYSTEM OVERVIEW

Our project increases net awesomeness by 2000%.

1.1 Subsection Heading Here

Subsection text here.

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2 CLIENT

Are the machines the clients or are we?

3 AP

We have OVER 9000 APs.

4 SERVER

Does your server serve like our server?

No. No it doesn't.

5 COMMUNICATIONS PROTOCOLS

This section outlines the communications protocols used from the controller of a client to the AP, from the AP to the controller of a client, from the AP to the server, and from the server to the AP.

5.1 Client to AP

When a client connects to an AP, its controller immediately send a frame to the AP. The frame is of the following form:

$$src\ addr\ |dst\ addr\ |meta\ |data$$

Where *src addr* is the 48-bit MAC address of the client, *dst addr* is the 48-bit MAC address of the AP to which the controller is communicating, and *meta* is the 8-bit value 00000001. *Data* is a variable-bit value defined as follows:

$$R\ |addrs$$

Where R is a 32-bit integer representing the maximum number of bits that the client will need to transmit over the course of any one second and *addrs* is the value formed of the concatenation of the 48-bit MAC addresses of all of the APs within range of the client. The MAC addresses which compose *addrs* are sorted in decreasing order of signal strength.

Every 30 seconds, the client sends a message to its AP. This message is of the following form:

$$src\ addr\ |dst\ addr\ |meta\ |data$$

Where *src addr* is the 48-bit MAC address of the client, *dst addr* is the 48-bit MAC address of the AP to which the controller is communicating, and *meta* is the 8-bit value 00000100. *Data* is a variable-bit value defined as follows:

$$G\ |A$$

Where G is a 32-bit integer representing the number of bits that the client generated over the past 30 seconds and A is a 32-bit integer representing the number of bits that the client successfully sent over the past 30 seconds.

5.2 AP to Client

When an AP needs to tell a client to connect to a different AP within range of the client, it sends a frame of the following form:

$$src\ addr\ |dst\ addr\ |meta\ |data$$

Where *src addr* is the 48-bit MAC address of the AP sending the frame, *dst addr* is the 48-bit MAC address of the client to which the AP wished to communicate, and *meta* is the 8-bit value 00000010. *Data* is 48-bit value specifying the AP to which the client should connect.

When an AP needs to tell the user of a client to move physically in order to connect to a different AP which is not in the immediate range of the client, it sends a frame of the following form:

$$src\ addr\ |dst\ addr\ |meta\ |data$$

Where *src addr* is the 48-bit MAC address of the AP sending the frame, *dst addr* is the 48-bit MAC address of the client to which the AP wished to communicate, and *meta* is the 8-bit value 00000011. *Data* is a 24-bit value defined as follows:

$$bld\ |rm$$

Where *bld* is a 12-bit binary integer specifying the building number of the desired AP and *rm* is a 12-bit integer specifying the room number of the desired AP.

5.3   AP to Server

When a new client connects to an AP, it sends a message to the IS&T server. This message is of the following form:

$$maddr \mid caddr \mid R$$

Where *maddr* is the 48-bit MAC address of the AP, *cddr* is the 48-bit MAC address of the client which just connected, and *R* is a 32-bit integer specifying the maximum number of bits that the client will need to transmit over the course of any one second.

Every 30 seconds, independent of any connected clients, the AP sends a message to the IS&T server. This message is of the following form:

$$maddr \mid cnum \mid rsum \mid asum \mid gsum$$

Where *maddr* is the 48-bit MAC address of the AP sending the message, *cnum* is a 7-bit integer specifying number of clients connected to the AP sending the message, *rsum* is a 39-bit integer specifying the maximum number of bits that the clients connected to the AP sending the message may need to send over any given second, *asum* is a 20-bit integer specifying how many bits clients have transmitted to the AP sending the message over the last 30 seconds, and *gsum* is a 39-bit integer specifying the number of bits that the clients connected to the AP sending the message have generated over the past 30 seconds.

5.4   Server to AP

When the IS&T server determines that an a client needs to connect to a different AP, it sends a message to the AP that client is currently connected to. This message takes the following form:

$$caddr \mid naddr \mid rlct$$

Where *caddr* is the 48-bit MAC address of the client which is being directed to switch to a new AP and *naddr* is the 48-bit MAC address of the AP to which the client is being directed to switch. *rlct* is a 24-bit value composed of all 0's if the AP in question is in range of the client in question or a 24-bit value defined as follows if it is not:

$$bld \mid rm$$

Where *bld* is a 12-bit binary integer specifying the building number of the desired AP and *rm* is a 12-bit integer specifying the room number of the desired AP.

APPENDIX A
PROOF OF THE FIRST ZONKLAR EQUATION

Appendix one text goes here.

APPENDIX B

Appendix two text goes here.