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*Software Design Document (SDD)*

# BOOTP Client

Version 0.1

# Table of Contents

# Software Design Document (SDD)

## 1 Introduction

### *1.1 Purpose*

The purpose of this document is to describe the design of the BOOTP Client (BootStrap Protocol Client).

### *1.2 Scope*

To design a BOOTP client which is a portable command line tool for Linux platform to request IP address for the host and default file from the BOOTP server which is on the same network as that of the BOOTP client and sets the IP address as the BOOTP Client's address.

### *1.3 Definitions, acronyms, and abbreviations*

BOOTP – Bootstrap Protocol

### *1.4 References*

- RFC 951

### *1.5 Overview*

This document describes the software design description of the BOOTP Client. Sub-section 2 describes ……

## 2 Design details

### *2.1 Module Design*

In BOOTP Client we have three main modules, they are as follows

#### 2.1.1 BOOTP Client Request Message Broadcast
#### 2.1.2 BOOTP Client Reply Message Acquisition
#### 2.1.3 BOOTP Client Set IP Address

## *2.2 Functional design*

A brief design description (pseudo code) of these functions

**2.2.1 Init()**
- Initialize all structures & variables used in program
- Obtain Network Hardware Address

**2.2.2 Broadcast()**
- Prepare for socket for Broadcast

**2.2.3 RandTID_Gen()**
- Transaction ID for BOOTP Packet is generated randomly.

**2.2.4 BootpRequest()**
- Fill the BOOTP Request Header with Client MAC Address.
- Broadcast in the network

**2.2.5 BootpReply()**
- Accept Packet and check Validity

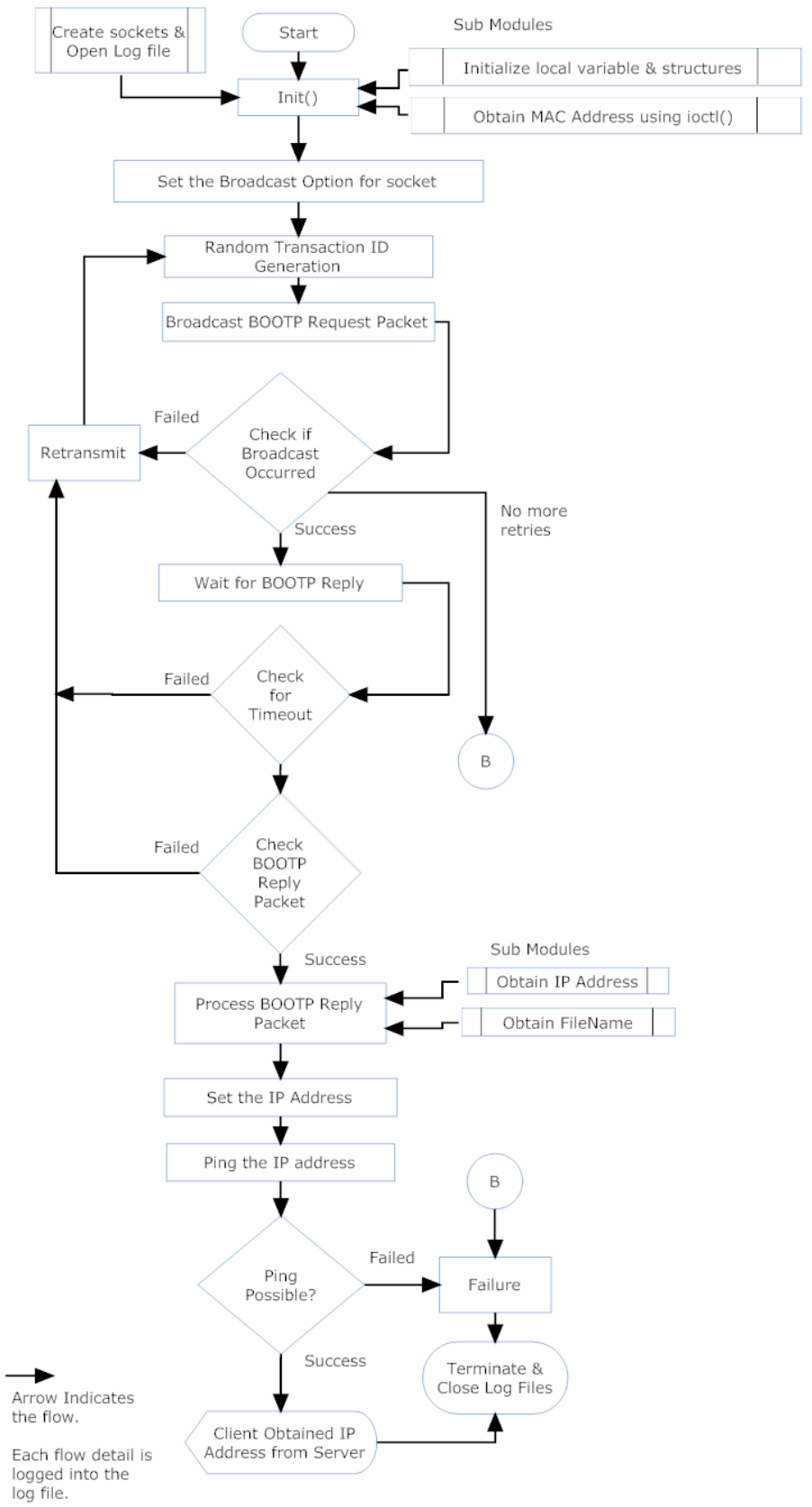
**2.2.6 Retransmission()**
- If BOOTP Packet has error then Broadcast BOOTP Request Packet again.
- If Timeout is set then Broadcast BOOTP Request Packet

**2.2.7 Failure()**
- When Retransmission failed. Stop Logging & Terminate

**2.2.8 Logging()**
- Action initiated by the BOOTP Client are logged into LOG File

**2.2.9 close()**
- Terminate Connection

An interactive flow chart representing the above functionalities is shown in the next page.


Create sockets & Open Log file
Start
Sub Modules
Initialize local variable & structures
Init()
Obtain MAC Address using ioctl()
Set the Broadcast Option for socket
Random Transaction ID Generation
Broadcast BOOTP Request Packet
Failed
Retransmit
Check if Broadcast Occurred
No more retries
Success
Wait for BOOTP Reply
Failed
Check for Timeout
B
Failed
Check BOOTP Reply Packet
Success
Sub Modules
Obtain IP Address
Process BOOTP Reply Packet
Obtain FileName
Set the IP Address
Ping the IP address
B
Failed
Ping Possible?
Failure
Success
Terminate & Close Log Files
Client Obtained IP Address from Server
Arrow Indicates the flow.
Each flow detail is logged into the log file.

## *2.3 Data design*

### 2.3.1 BOOTP Packet Header

| S.No | FIELD | BYTES | DESCRIPTION |
|---|---|---|---|
| 1 | op | 1 | Packet op code/ message type<br>1 = BOOTPREQUEST, 2 = BOOTPREPLY |
| 2 | htype | 1 | hardware address type,<br>'1' = 10mb ethernet |
| 3 | hlen | 1 | hardware address length<br>(eg '6' for 10mb Ethernet) |
| 4 | hops | 1 | client sets to zero,<br>optionally used by gateways<br>in cross-gateway booting. |
| 5 | xid | 4 | transaction ID, a random number,<br>used to match this boot request with the<br>responses it generates. |
| 6 | secs | 2 | filled in by client, seconds elapsed since<br>client started trying to boot. |
| 7 | -- | 2 | unused |
| 8 | ciaddr | 4 | client IP address;<br>filled in by client in bootrequest if known. |
| 9 | yiaddr | 4 | 'your' (client) IP address;<br>filled by server if client doesn't<br>know its own address (ciaddr was 0). |
| 10 | siaddr | 4 | server IP address;<br>returned in bootreply by server. |
| 11 | giaddr | 4 | gateway IP address,<br>used in optional cross-gateway booting. |
| 12 | chaddr | 16 | client hardware address,<br>filled in by client. |
| 13 | sname | 64 | optional server host name,<br>null terminated string. |
| 14 | file | 128 | boot file name, null terminated string;<br>'generic' name or null in bootrequest,<br>fully qualified directory-path<br>name in bootreply. |
| 15 | vend | 64 | optional vendor-specific area,<br>e.g. could be hardware type/serial on request, e.g. could be hardware type/serial on request, on reply. This info may be set aside for use by a third phase bootstrap or kernel. |