SoundPoint® IP Family Technical Bulletin – TB41856

Optimizing Boot Speed of Polycom SoundPoint IP products

This information applies to:
- All SoundPoint IP products running SIP software.

The information in this document is accurate for phones running SIP 3.0.x and BootROM 4.1.x firmware. For earlier versions of the firmware, there may be some slight variations in some of the detailed behavior description.

SUMMARY

In normal operation, the boot time of SoundPoint IP products should be as follows:
- SoundPoint IP 320, 330, 430, 550, 560, 650 – optimal: 45 seconds; normal < 90 seconds
- SoundPoint IP 300, 301, 501, 600, 601 – optimal: 90 seconds; normal < 150 seconds

The normal boot up process assumes the presence of a boot server, where all the configuration files reside, and allows for the phone to write log and back up files to the same boot server.

In situations where a boot server is not present or write access is not enabled, there are some configuration parameters that may be set to speed up the boot process.

These are accessible through the **Advanced** Settings Menu accessed from **Menu >Settings >Advanced > Admin Settings >Network Configuration**. You will be prompted for the administrative password after you select the **Advanced** menu entry, which is "456" by default.

Under Network Configuration, the following parameters are used by the phone during the boot up process:

DHCP Menu
- Boot Server: "Static", "Custom", "Option 66", "Custom + Option 66" – the factory default is "Custom + Option 66"
- BootSrvOpt: 128-255 – the factory default is 160
- BootSrvType: "String", "IP address" – the factory default is "String"

Server Menu
- Server Type: "tftp", "ftp", "http", "https" – the factory default is "ftp"
- Server Address: URI or IP address – the factory default is "0.0.0.0"
- Server User: Log-in for boot server – the factory default is "PlcmSpIp"
- Server Password: Log-in for boot server – the factory default is "PlcmSpIp"
- File Tx Tries: Number of times the phone will attempt to access files from the boot server – the factory default is 3
- Retry Wait: Time to Wait between re-tries – the factory default is 1 second

Note:
1. The factory default settings documented above have been in use since January 2007. Changes to these settings are communicated to partners and customers by means of Technical Bulletins. Technical Bulletins are available at http://www.polycom.com/usa/en/support/voice/soundpoint_ip/VoIP_Technical_Bulletins_pub.html. Refer to Technical Bulletins 18778, 38447, and 41374 for information pertaining to factory default settings.
2. The server type, server user and server password may be explicitly included in the server address string in which case the server address will override the configured settings. This is useful in cases where http(s) or tftp provisioning is desired without changing any of the default settings. For example, tftp://provisioning.server or https://provisioning.server;USER=user; PASSWORD=password. This setting is often set in the DHCP OPTION 66 or 160 setting communicated by the DHCP server.

BOOT UP SEQUENCE

Boot Up is initiated when the phone is powered on or rebooted.

The phone follows these steps during boot-up:
1. Upload log files (except for power-on reboot).
2. Provisioning Server Discovery:
   a. Acquire an IP address from the network (normally using DHCP).
   b. Inspect the DHCP OFFER response for a boot server address according to the Boot Server and Boot Server Option parameter (Factory Default Custom Option 160 or Option 66).
   c. If the boot server address is not found in the DHCP OFFER response (and the Boot Server Address is Null or 0.0.0.0), send a DHCP INFORM request asking for the boot server address according to the settings in Boot Server and Boot Server Option.
   d. If boot server is not found by step b. or c., use Boot Server Address setting.

3. Software Update Check
    a. Check the root directory of the boot server for a **<PHONE-MODEL>-bootrom.ld** or **bootrom.ld**. If it is present, check if it is different from the BootROM software currently on the phone; if it is different, upgrade the BootROM.
    b. Check the root directory of the boot server for a **<MAC-ADDRESS>.cfg** file or **000000000000.cfg**. This file is referred to as the "Master Configuration" File. Check this file for the APP_FILE_PATH parameter.
    c. Search the APP_FILE_PATH for a **<PHONE-MODEL>-sip.ld** or **sip.ld** file. If it is present, compare version to the version currently loaded on the phone; if it is different, upgrade the SIP software.
4. Phone Provisioning
    a. Check the Master Configuration file for a list of configuration files to be used for provisioning.
    b. Read each of the files listed in the master configuration file.
    c. Read the phone**-<MAC-ADDRESS>.cfg** file for user default 'over-ride' settings.
    d. Read **DIRECTORY-PATH/<MAC-ADDRESS>-directory.xml** for contact directory/speed-dial entries.
    e. Look for a **<MAC-ADDRESS>-license.cfg** or **000000000000-license.cfg** file for any licensed features.
    f. Download MISC files.

OPTIMAL BOOT SERVER CONFIGURATION METHODS

When implementing a provisioning server solution the following are recommended best practices and will result in optimal phone boot speed and phone maintainability.

1. Utilize a reliable, high availability provisioning server that has sufficient capacity to manage the boot-up of all phones on the network in the event of a site-wide power failure.
2. Use a file transfer protocol that has built in error detection and recovery, for example, FTP, HTTP, or HTTPS.
3. Allow phones to write log files, directory files and user preference settings to the provisioning server. These can be written to a different directory or even different server using the configuration file settings
4. Use an automated method of communicating the boot server address to the phone (in this way, the user/installer is not required to enter anything on the phone):
    a. Use DHCP to set the boot server address using Option 160 or Option 66.
    b. If the local DHCP server does not allow broadcast of the boot server address, install a secondary DHCP INFORM server in the network.

c. Entering the server address as a URL string is more flexible than entering a specific IP address. This allows the use of DNS for control of server location and redundancy

COMMON PROVISIONING ISSUES and MITIGATION METHODS

If the Boot Server does not have write access

During the provisioning process, the phone will attempt to write log files to the boot server. It will attempt these writes according to the re-try processes appropriate for the boot server protocol. The delay due to write attempts can be minimized by ensuring that write attempts are actively 'NACK'ed by the server.

No provisioning server is present

The phone will attempt to look for software and configuration files at the server address established during the "Provisioning Server Discovery" phase. If this server is not available, attempts to access this server will be tried multiple times with delays as specified by the access protocol. This can cause the boot times to increase to as much as 20 minutes. To reduce the time, the boot server type should be set to static and the boot server address should be set to Null or 0.0.0.0. Neither of these is a 'valid' IP address or path name and hence the attempts to access files will time out very quickly.

Setting File Tx Tries=1 and Retry Wait to 0 will also help.

Phone is configured with a static boot server address, but the Boot Server Type set to a DHCP setting

Note: This section applies if BootROM 4.0.x and/or SIP 2.2.x or SIP 3.0.0 are used.

Many phone distributors or resellers set the boot serve address to the address of the boot server appropriate for the customer. In many cases, however, the Boot Server type remains set to "Custom + Option 66". In BootROM 4.0.x and SIP 2.2.x, this would cause the phone to attempt a DHCP INFORM process. When this process receives no response, it takes about 2.5 minutes to time out. This process is carried out once by the BootROM and once by the SIP application, causing a potential addition of five minutes to the boot-up process. To avoid this delay, the Boot Server Option should be set to "Static".

In BootROM 4.1.0 (and later) and SIP 3.0.1 (and later), the firmware was modified such that the DHCP INFORM check will only be attempted if the Boot Server Address is set to "0.0.0.0" or Null and DHCP Boot Server is set to "Custom + Option 66". This avoids the delay when the boot server address is set to a 'real' address even if a DHCP option is enabled.

No Master Configuration file was found

The Master Configuration file is located on the root of the boot server and is named **<MAC-ADDRESS>.cfg** (where MAC-ADDRESS is the phone's unique network address) or **000000000000.cfg**. If this file is missing, the phone will use internal copy of configuration files. If for some reason the internal master configuration file is missing or corrupted, the phone will fail to boot and the message <Error Loading <MAC-ADDRESS>.cfg appears.

The only way to rectify this issue is to provision the phone from a server that has the expected configuration files present.

Configuration File is Missing or Corrupted

If, for some reason, a file referenced in the Master Configuration file is not present on the boot server, the phone will use its internal copy of the file. If the internal copy is corrupted or removed, the phone will fail to boot and the message "Config. File error 0xNN" appears, where NN may be one of several numbers.

The only way to rectify this issue is to provision the phone from a server that has the expected configuration files present.

FUTURE ENHANCEMENTS

Polycom continually evaluates methods to improve the speed and versatility of the phone provisioning process. SIP release 3.0.3 will include a menu-controlled restart option that will reduce the time for a user-initiated restart to effect a configuration change by up to 50%.

Refer to the firmware release notes for future enhancements in this area.

REFERENCES

1. White paper – Configuration File Management on SoundPoint IP Phones: http://www.polycom.com/common/documents/support/technical/products/voice/white_paper_configuration_file_management_on_soundpoint_ip_phones.pdf
2. SoundPoint IP/SoundStation IP Administrator's Guide – accessible from any SoundPoint IP or SoundStation IP support page (for example http://www.polycom.com/usa/en/support/voice/soundpoint_ip/soundpoint_ip650.html)
3. VoIP Technical Bulletins: http://www.polycom.com/usa/en/support/voice/soundpoint_ip/VoIP_Technical_Bulletins_pub.html
4. SIP Software Release Matrix: http://downloads.polycom.com/voice/voip/sip_sw_releases_matrix.html