SpektrixApp Technical Overview

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Introduction

The SpektrixApp provides a mechanism for the Spektrix cloud box office solution to communicate with hardware (printers and chip & pin terminals) located on a client site. It does this using an HTTP push technology called long polling. From a high level point of view, the app connects to Spektrix via HTTP and waits for Spektrix to send it messages. On receiving a message the app determines what action to perform and then performs that action.

Components

The SpektrixApp consists of three program components:

- SpektrixAppService.exe
- SpektrixApp.exe
- SpektrixAppGui.exe

SpektrixAppService.exe is a Windows service which runs in the background on the machine on which the SpektrixApp is installed. It continuously monitors whether the SpektrixApp application is running or has crashed. If it detects that the app is not running it starts it. If it detects that the app has crashed it terminates it and starts a new one. The SpektrixAppService also deals with a computer entering ‘sleep’ or ‘hibernate’ mode by stopping and restarting the app as appropriate.

SpektrixAppGui.exe is a Windows Forms application that starts when a user logs in to a machine on which the SpektrixApp is installed. It displays a system tray icon that allows the user to monitor the status of the app. If the app is running and connected to Spektrix a green Spektrix logo is displayed. If not, a red exclamation mark overlayed on a yellow Spektrix logo is displayed and a tooltip message displays details about the problem.

The SpektrixAppGui provides functionality for the user to register the app with Spektrix and to configure the app once it has been registered. This functionality can be access via right-clicking the SpektrixAppGui system tray icon.

Finally, the SpektrixAppGui is responsible for managing the interaction with the chip and pin software installed on the machine.

SpektrixApp.exe is a Windows application that provides the guts of the system. It is started by the SpektrixAppService and runs in the background on the machine on which the app is installed. Once regWhen it starts it connects to Spektrix and listens for messages. Messages are sent in response to user actions such as printing tickets or taking a chip and pin payment. Each time a message is received it is put in a queue to be processed.

When a print message is received, SpektrixApp.exe decodes the print job and sends it to the appropriate printer. When a chip and pin message is received SpektrixApp.exe passes the message on to the appropriate SpektrixGui which initiates a chip and pin transaction, waits for it to complete and then sends the result back to SpektrixApp.exe which then forwards it back to Spektrix.

Communication/Push Technology

SpektrixApp.exe uses a technique call long polling to allow Spektrix to communicate with it. When it starts it connects to Spektrix by issuing an HTTP GET request[1]. The Spektrix system never terminates this request, it keeps it open so that it can use it in the future when it needs to send a message to the app. The idle timeout on the request is set to 150 seconds so that it stays open for an extended amount of time (much longer than a standard HTTP request). To prevent the request from being timed out the SpektrixApp asks Spektrix to send it a ping[2] message every 120 seconds so as to reset the request's idle timer (a keep-alive). In this manner a constant open, connection to Spektrix is maintained.

Once a constant connection has been established Spektrix can send messages to the app as necessary to perform printing and take chip and pin payments.

The diagram at the end of this section details the communication process described above.

Reconnecting

If the SpektrixApp.exe detects that the connection has closed for whatever reason, it immediately attempts to reconnect to Spektrix. The app will continue to try to reconnect every 5 seconds until a new connection is established[3].

[1] All communication is done over SSL using port 443.
[2] Not an ICMP ping, a special Spektrix to SpektrixApp message that we call a ping.
[3] The first 5 attempts will be every second.

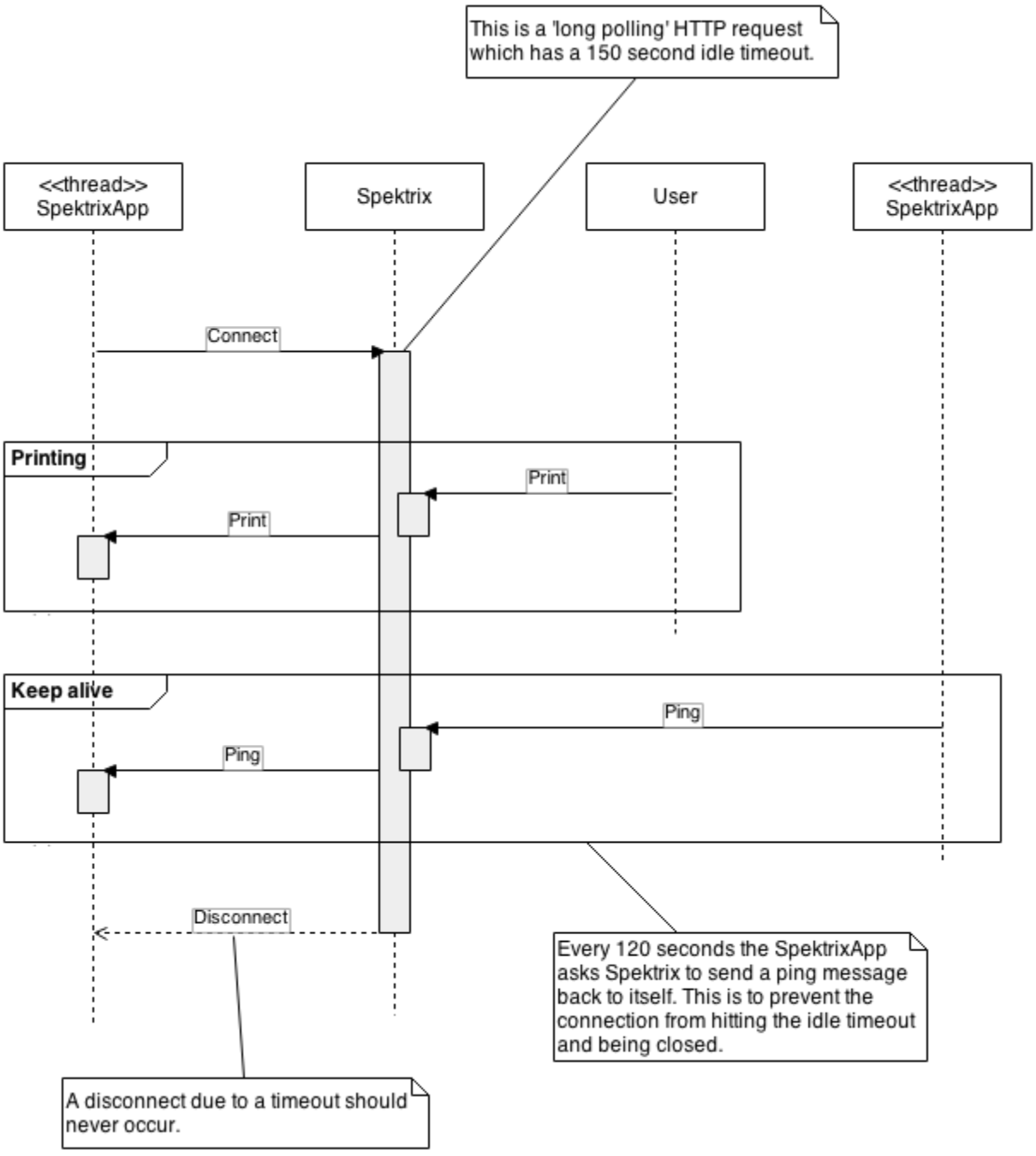
Proxy Servers

The SpektrixApp can connect to Spektrix via proxy servers that support the CONNECT method (this has only been tested with the Squid proxy server). The CONNECT method works by creating a tunnel between the app and Spektrix via the proxy. The process is as follows:

1. SpektrixApp.exe sends a CONNECT request to the proxy, instructing the proxy to open a connection to Spektrix on port 443.
2. The proxy makes a connection to Spektrix and responds to SpektrixApp telling it that it's connected.
3. SpektrixApp.exe then uses this tunnel to send data to Spektrix.

At no point can the proxy inspect the data that is travelling between SpektrixApp and Spektrix.

Using a proxy server, however, introduces more moving parts to the system and can cause problems. For example, if the proxy server has a timeout attached to the tunnel that is smaller than the app ping period the app can be silently disconnected from Spektrix. Other, more difficult to diagnose problems could occur if load balancing is employed on the proxy. We therefore do not recommend using the SpektrixApp behind a proxy.


This is a 'long polling' HTTP request which has a 150 second idle timeout.
<<thread>> SpektrixApp
Spektrix
User
<<thread>> SpektrixApp
Connect
Printing
Print
Print
Keep alive
Ping
Ping
Disconnect
Every 120 seconds the SpektrixApp asks Spektrix to send a ping message back to itself. This is to prevent the connection from hitting the idle timeout and being closed.
A disconnect due to a timeout should never occur.