# ASCEND Cashiering Printing Bridge

## Overview

This document describes a proposed solution that enables headless printing from the Service Cloud Browser User Interface to the CognitiveTPG A776 printer attached to cashiering workstations.

Cashiering has two separate printing functions during payment transactions. Printing a receipt for the customer and endorsing the check if payment is by check. The TPG printer has two separate printers in a single device package. A thermal printer for receipts, and a ‘slip’ printer for endorsing checks.

## Browser Printing Issues

The initial implementation of printing for cashiering uses the JavaScript window.print() function. This works correctly, but has two issues that don’t align with the cashier printing requirements.

1. The user is presented with a print preview dialog box, where they must select the printer and click ‘OK’ to initiate printing.

We have heard that the business does not want this extra step; they want to complete the payment transaction and have the receipt automatically print.

1. The user needs to select the correct printer from a potential list of many printers in the print dialog. For receipts, they must select the “CognitiveTPG Receipt” and for check endorsement, they must select “CognitiveTPG Narrow Slip.

This is also undesirable for the business and can involve 3-5 clicks for each printout, not just the 1-click if we were only printing receipts.

This challenge requires a solution that can allow the Service Cloud extensions to print entirely headless (no dialogs) and also allow the extension to select the appropriate destination printer.

## Solution

The solution to enable headless printing to a target printer is implementing a custom printing “bridge” with API(s) called by the extension to print to the appropriate printer.

## Printing Bridge High-level Overview

The printing bridge is being implemented in C#/.NET and will need to be installed on each printer workstation.

Note: We can implement the bridge to be installed as a startup application or a Windows service. We need guidance in that regard.

The Printer Bridge will listen on a WebSocket for messages from the browser. The browser will send a payload indicating the content to be printed and the target printer. The bridge will then render the content as a PDF and print it to the target printer.

There are two endpoints for the printer bridge: one that accepts a handlebars template and a data object to merge and print. The other that will accept HTML (with embedded CSS) to render and print.

## Solution Components

The solution is built targeting Windows 64, .NET 8.0, and implemented in C#.

It uses three third-party open-source NuGet packages in its implementation:

**Handlbars.Net**

Handlebars is a popular templating engine for merging data into a template defined in the Handlebars syntax. It is frequently used with an HTML-based template, which is what we are doing for cashier printing.

**Puppeteer Sharp**

Puppeteer Sharp is a very popular browser testing automation library. For the printer bridge, it is used as a headless web browser for rendering the HTML to a headless page and then saving that page as PDF for printing.

**PDFtoPrinter**

PDFtoPrinter takes the PDF generated by Puppeteer and allows us to print it to a target printer without any print dialogs.

## Security Considerations

I will answer some of the anticipated Security questions and concerns here.

*How are the connections to the printer bridge secured?*

The printer bridge listens for WebSocket connections on the IPv4 and IPv6 loopback IP addresses, thereby preventing external connections. The only connections possible are from the same device.

TLS is not implemented for browser-bridge communication since it does not traverse the network. However, if it is desired to encrypt that connection, it can be done by configuring the service with SSL server keys.

Does the printer bridge connect to the cloud or transmit data anywhere?

No, the bridge operates entirely locally and does not require any external services or network communications to function.

*Does the printer bridge process or handle any PII?*

Not directly, but the printed data sent to it may contain PII. The bridge will temporarily save a PDF file for printing. It will then immediately delete that file after printing has finished.