PayComplete

ConnectCube

Developing kiosks for financial transactions: Getting a better solution, to market, faster.

A WHITE PAPER FROM PAYCOMPLETE

Companies have discovered that kiosks can supplement their operations and help scale up or down much more efficiently to accommodate the ebb and flow of their business. This approach has been a central part of the payment methodologies across the Public Transport sector, from parking payment to fare collection.

In recent years COVID-19 has placed emphasis on a company's ability to continue its operations with as little human contact as possible. Companies have very quickly needed to reduce human contact, with kiosks as a key factor in helping their businesses thrive.

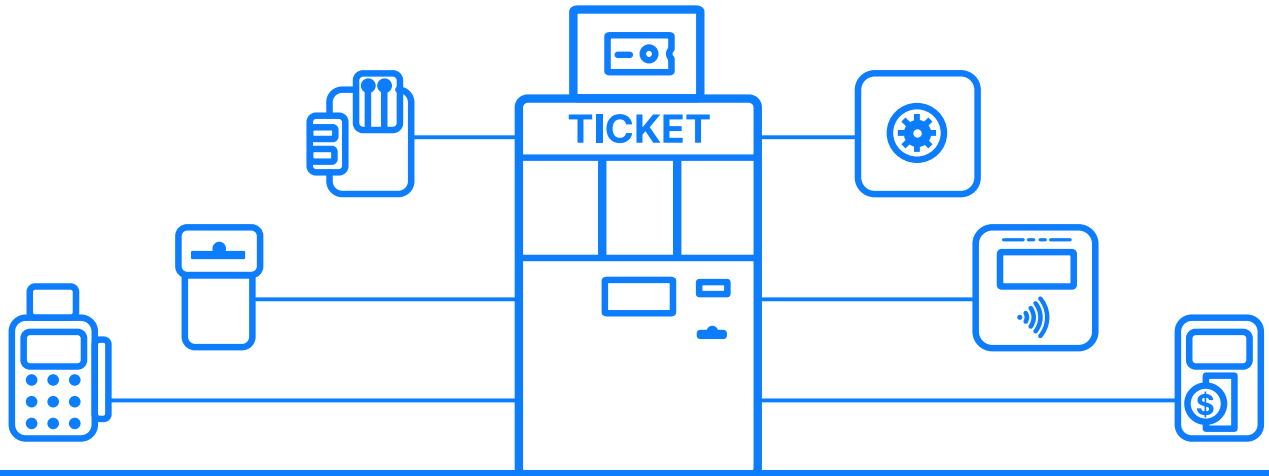
This increasingly familiar relationship between the public and technology offer service providers opportunities to improve their offerings, update technology and add additional services to their kiosk offerings.

THE CHALLENGE

The modern consumer has high expectations of self-service devices, especially speed, ease of use and functionality.

However, behind that is a large and complex technological challenge from component selection to integration; from payment handing and balancing of contents through to engineering services, remote management, and reporting.

These factors, together with keeping up with general and ongoing market technology changes, make the product development process both significant and costly, and the time to market for new products lengthy.



ConnectCube

The ConnectCube platform offers a radically different approach to kiosk development.

So radically different, in fact, that this paper will show that with only limited code you can create a kiosk platform to manage financial transactions.

Some of the key functions supported include:

- Access to a wide selection of components for payment handling from a range of manufacturers
- Full cash management and audit functionality,
- System and device error handling and management
- Remote management and reporting of both devices and contents.

ConnectCube enables transactional device manufacturers to rapidly develop new solutions through the provision of an API and infrastructure management solution that sits with the operating system.

With an extensive library of components supported, this transaction-centric operating system governs the core transaction concepts, such as purchases, payments, deposit, dispense, refill, and more, that drive kiosk operations.

To demonstrate the simplicity of process and potential speed with which a solution can be developed, the code used for a basic payment kiosk solution supporting a number of features is shown in the following pages.
The process shown on the following pages uses the SDK rather than API, but reflects the flexibility and simplicity of the integration and development process within ConnectCube and the options available to kiosk developers.

Our example shows a basic payment solution that uses some of the features of Cube and will:

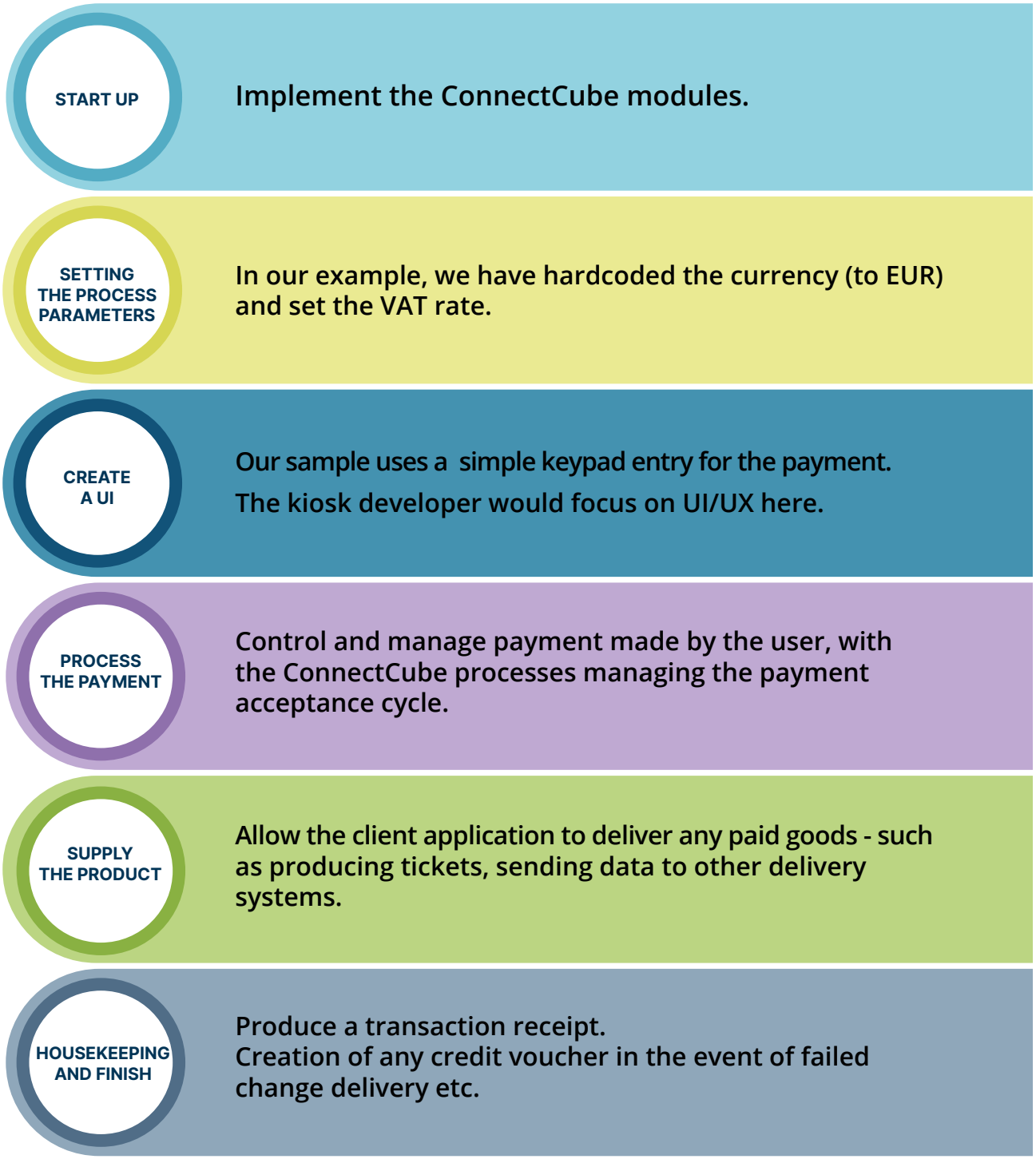
- Present a pin pad where the user can input a payment amount
- Process the payment - for whichever acceptance devices are connected
- Dispense any required change, assuming dispensing devices are connected and have stocks.
- Print a receipt
- Create a QR coded credit voucher if change not available

In addition to the functions included within our simple demonstration, here are a few other things that ConnectCube can manage, so that the kiosk application doesn't have to:

- VAT calculations
- Payment types (cash/cashless loyalty system/tokens/ credits)
- Split payments between tender types (e.g. part cash and part cashless)
- Overpayment handling
- Reporting of accounting data (including products sold and usage)
- Handling of price tables (nominal prices, discount prices, prices per tender type)

Process Flow

This example is designed to simply and easily explain the potential processes and key tasks within the developers kiosk application.



The colour coded sections reflect the functionality in the complete code example shown on **page 6**

PayComplete

START UP

```
package com.paycomplete.intertraffic;

import java.util.Arrays;
import java.util.Currency;
import java.util.HashMap;

import com.paycomplete.sdk.oj.IOJFlowSession;
import com.paycomplete.sdk.oj.IOJProduct;
import com.paycomplete.sdk.oj.IOJPurchaseManager;
import com.paycomplete.sdk.oj.IOJRegistrator;
import com.paycomplete.sdk.oj.IOJUIManager;
import com.paycomplete.sdk.oj.OJPrinterException;
import com.paycomplete.sdk.oj.IOJPrinter.OJStandardReceiptType;
import com.paycomplete.sdk.plugin.IOJFlow;
import com.paycomplete.sdk.plugin.IOJPaymentListener;
import com.paycomplete.sdk.plugin.IOJPlugin;
import com.paycomplete.sdk.utils.OJMoney;
import com.paycomplete.sdk.utils.OJMoney.CurrencyFormat;
import com.paycomplete.sdk.utils.OJMoney.OJMoneyType;
import com.paycomplete.sdk.utils.OJMoneyBag;
import com.paycomplete.sdk.utils.OJPriceTableEntry;

/**
 * This example shows the payment functionality as a Java plugin. The same functionality
 * is also available as a REST API.
 */
public class PaymentHandler implements IOJPlugin
{
```

SETTING THE PROCESS PARAMETERS

```
  private static final Currency CURRENCY = Currency.getInstance( "EUR" );
  private static final float VAT = 20f; // 20% VAT

  @Override
  public void initialize( IOJRegistrator registrator )
  {
    try
    {
      registrator.registerBootFlow( new PaymentFlow() );
    }
    catch ( Exception e )
    {
    }
  }

  private class PaymentFlow implements IOJFlow
  {
    private OJMoneyBag amountPaid = new OJMoneyBag();
    private OJMoneyBag amountToPay = new OJMoneyBag();
    private boolean isCancelPossible = false;

    @Override
    public void run( IOJFlowSession session )
    {
      while ( true )
      {
        Integer amount = session.getUIManager().inputNumber( "Enter amount to pay in " + CURRENCY.getCurrencyCode(),
            0, false, 0, Integer.MAX_VALUE, CURRENCY.getDefaultFractionDigits() );

        if ( amount == null )
        {
          break; // Return control to the standard Connect on-Device flows
        }

        try
        {
          session.getUserManager().loginDefaultUser();

          amountToPay = new OJMoneyBag( Arrays.asList( new OJMoney( CURRENCY, amount, OJMoneyType.NOTE, 1 ) ) );
          amountPaid = new OJMoneyBag();
          isCancelPossible = false;
          showPaymentScreen( session );

          final IOJPurchaseManager purchase = session.getPurchaseManager();

          purchase.beginPurchase( CURRENCY, VAT );

          IOJProduct product = purchase.createProduct( "Example group", "Example product",
              new OJPriceTableEntry( amount, amount),   // Cash price
              new OJPriceTableEntry( amount, amount),   // Credit card price
              new OJPriceTableEntry( amount, amount) ); // Loyalty card price

          session.getUIManager().addKeyListener( ( key ) ->
          {
            if ( key == IOJUIManager.OJKey.KEY_CANCEL )
            {
              purchase.cancelPayment();
            }
          } );

          boolean completed = purchase.doPayment( Arrays.asList( product ),
              Arrays.asList( IOJPurchaseManager.PaymentType.values() ),
              new IOJPaymentListener()
          {
```

CREATE A UI

PROCESS THE PAYMENT

PayComplete

PROCESS THE PAYMENT

```
        public void setCancelPossible( boolean cancelPossible )
        {
          isCancelPossible = cancelPossible;
          showPaymentScreen( session );
        }

        @Override
        public void updatePayment( OJMoneyBag paid )
        {
          amountPaid = paid;
          showPaymentScreen( session );
        }

        @Override
        public void externalPayment()
        {
          session.getUIManager().showTextScreen( "Please make your payment", "Follow instructions on terminal", null, null );
        }

        @Override
        public void externalPaymentAborted( AbortReason reason )
        {
          session.getUIManager().showTextScreen( "Please make your payment", "Aborted", null, null );
        }

      } );

      session.getUIManager().removeAllKeyListeners();
      isCancelPossible = false;
      showPaymentScreen( session );

      if ( completed )
      {
```

SUPPLY THE PRODUCT

```
        session.getUIManager().showTextScreen( "", "Supplying products...", null, null );

        // TODO: Supply the products (this is managed by the application itself)

        product.setDelivered( true, null, "", -1 );
      }

      session.getUIManager().showTextScreen( "", "Supplying change...", null, null );
      purchase.payChange();

      purchase.endPurchase();

      session.getUIManager().showTextScreen( "", "Printing receipt...", null, null );
      try
      {
        session.getDeviceManager().getPrinter().printStandardReceipt( OJStandardReceiptType.PURCHASE );
      }
      catch ( OJPrinterException e )
      {
      }

      // Print a voucher if there are remaining change that wasn't paid out
      if ( session.getUserManager().getCurrentUser().getCredits().getMoney().stream().mapToInt(
          m -> m.getNumberOfItems() ).sum() > 0 )
      {
        purchase.giveVoucher( null, VAT ); // This returns a reference that we can choose to put in a database
        session.getUIManager().showTextScreen( "", "Printing voucher...", null, null );
        try
        {
          session.getDeviceManager().getPrinter().printStandardReceipt( OJStandardReceiptType.CREDITS_REFUND );
        }
        catch ( OJPrinterException e )
        {
        }
      }
```

HOUSEKEEPING AND FINISH

```
    }
    finally
    {
      session.getUserManager().logout();
    }
  }
}

private void showPaymentScreen( IOJFlowSession session )
{
  HashMap<IOJUIManager.OJKey, String> keys = new HashMap<>();
  if ( isCancelPossible )
  {
    keys.put( IOJUIManager.OJKey.KEY_CANCEL, "Cancel" );
  }

  session.getUIManager().showTextScreen( "Please make your payment", "Paid: " +
      amountPaid.getFormattedValue( session.getSystemManager().getLocale(), "", CurrencyFormat.CURRENCY_CODE, false, false ) +
      "<br>To pay: " +
      amountToPay.getFormattedValue( session.getSystemManager().getLocale(), "", CurrencyFormat.CURRENCY_CODE, false, false ),
      null, keys );
}
}
```

Benefits of the Cube Platform

The application process within the ConnectCube development solution is simple and effective allowing a fully functional payment application, albeit basic, to be created in 2 pages of code.

Behind this simple solution is a powerful engine that enables your application to operate with a wide range of readily availably payment devices, giving the maximum flexibility for kiosk configuration. Supported equipment includes a broad range of devices including cash handling, card readers, printers bar code and QR scanners, screens, through to complete payment systems.

The ConnectCube platform manages the internal financial transactions including keeping track of current balances across all devices within the kiosk.

In addition, the transactional data, device status and health (for all key peripherals), alerts, remote service and transactional reporting are automatically communicated to the cloud based central management system.

With built in Zero Touch Service methodologies, the remote system allows operators to manage and maintain a wide estate of systems simply and efficiently, whilst allowing for components, and feature updates to be carried out remotely.

Faster Design, Lower Costs

The ConnectCube platform creates flexibility in the use of device components, generating benefits for both the technical design team – access to the widest range and the latest solutions – and for the commercial team – easy 'dual sourcing' of key devices elements without the need to have additional engineering work carried out to bring onboard new suppliers.

With this flexibility the ConnectCube platform allows the deployment of large kiosk networks, with a 'ready to go' cloud management system, allowing developers to both support their estate and to act as a tool they can offer to their end users for local estate management.

TAKE THE NEXT STEP...

...and get in touch with PayComplete to gain access to the developer portal, see how quick and easy it can be to get a new kiosk with financial transactions, and start your next project now.

info@paycomplete.com

Excellence through Heritage and innovation

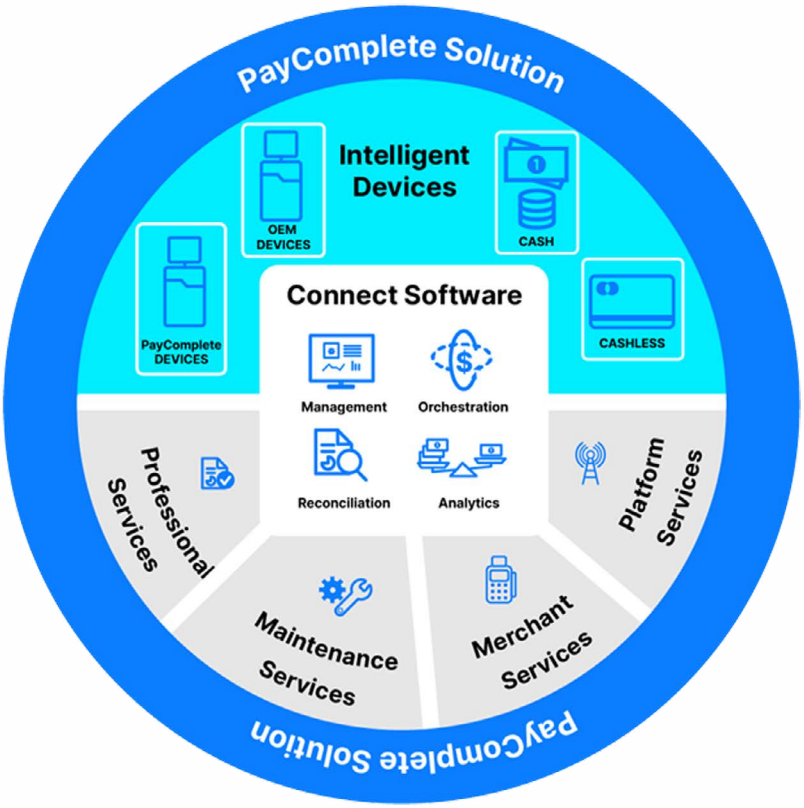
PayComplete is the global leader in cash management solutions, combining best in class hardware solutions with game changing software, unifying cash management with other key payments and operational systems.

Dedicated to innovating self-service experiences and operations for both consumers and employees, The PayComplete IoT platform is made up of an adaptable set of SaaS and machine software, intelligent devices, and professional, technical and merchant services.

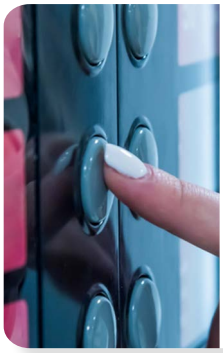
PayComplete Connect unifies the management of transactions, users, devices, and data across the enterprise, bringing digital precision to cash transactions and systems.

ABOUT US

PayComplete serves a broad range of industries, including retail, transportation, financial services, vending, cash centers, mints and more.
Industry leaders, work with PayComplete to make their cash transaction-based businesses more innovative, agile, and efficient.

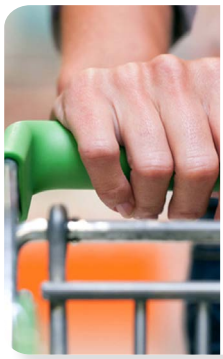


OUR MARKETS



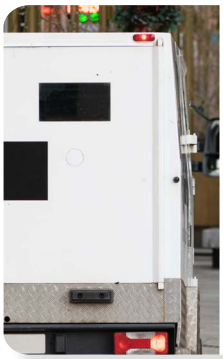
VENDING

Consumer demand for automation is growing, and PayComplete enables operators to create and deploy innovative new mini-retail and self-service solutions.



RETAIL

A wide range of merchants are using PayComplete to develop new self-service solutions that help them improve the customer experience, boost in-store efficiency, and make better decisions for their business.

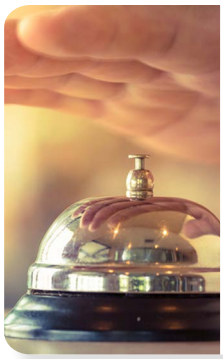


CASH CENTERS & MINTS

With PayComplete's digital approach to cash management, cash processors are modernizing how coins move through cash centers and mints. The result is greater efficiency, increased recirculation, and lower minting costs.

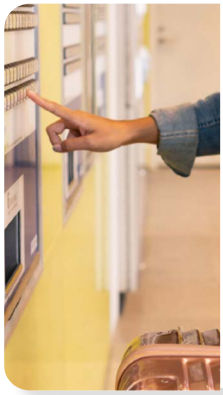
MASS TRANSIT & PARKING

Whether by car, public transport, or new mobility services, traveller payment convenience is improved throughout the journey with PayComplete solutions, along with the operational efficiencies of service providers.



HOSPITALITY & LEISURE

PayComplete empowers hospitality and leisure hosts to provide great experiences for returning guests, and also operate efficiently amidst staff shortages and margin squeezes.



OEMS & SYSTEM BUILDERS

PayComplete empowers device OEMs and systems builders to develop and deploy smart, connected, and differentiated transactional devices faster by leveraging a broad range of components, software, and services.

BANKING & FINANCIAL SERVICES

As the number of staffed branches decreases, PayComplete provides self-service solutions that give banking customers more options. Cash management solutions improve branch operations and broaden treasury portfolios.

PayComplete