

Project Controls Expo UK - 13th November 2019
Emirates Arsenal Stadium, London

Reducing the burden of repetitive tasks within a project environment

Dr James Smith
CTO, Projecting Success



About the Speaker

Dr James Smith – CTO at Projecting Success

Dr James Smith is the Chief Technology Officer at Projecting Success.

He is responsible for a wide scope, spanning full stack development through to data science, AI and data governance.



What's in store?

1. An introduction to Robotic Process Automation (RPA)

- What is RPA?
- What can RPA do?
- RPA vendors

2. Some background information

3. The use cases:

- **Projecting Success** – Processing employee timesheets
- **KIER** – BIM models
- **Data Friends** – Web scraping data
- **Balfour Beatty** – Automating document naming conventions
- **Osborne** – Optimising how to process delivery notes

Anne-Marie Cobb



Declan Langan



James Smith



A massive thanks to:



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Practical Data Science Education



Balfour Beatty



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In particular...



Anne-Marie Cobb



Declan Langan

Balfour Beatty



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Introduction

Interests:

- Mathematics and modelling – to the right is the 5th Painlevé *equation*
- Machine learning – a genuine interest in machine learning. My first interaction with machine learning was through projects I had built
- Computers and tech – I am fascinated with computers and tech. I have my own Pi with lots of simultaneous projects and not enough time to complete them all!

$$\frac{d^2y}{dt^2} = \left(\frac{1}{2y} + \frac{1}{y-1} \right) \left(\frac{dy}{dt} \right)^2 - \frac{1}{t} \frac{dy}{dt} + \frac{(y-1)^2}{t^2} \left(\alpha y + \frac{\beta}{y} \right) + \gamma \frac{y}{t} + \delta \frac{y(y+1)}{y-1}$$

Introduction

Professional

- 2015 - Completed my PhD in applied Mathematics - [*Painlevé equations and Orthogonal Polynomials*](#)
- 2015 - 2017 - Lectured mathematics at the University of Kent
- 2017 - Joined **Projecting Success**
- 2018 - Neo4j certified



An introduction to RPA

If you can

Click it

Type it

Copy/Paste it

Scrape it

Excel it

OCR it

...you can automate it



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An introduction to RPA

Good candidates

Highly repetitive

Mundane

Rules based

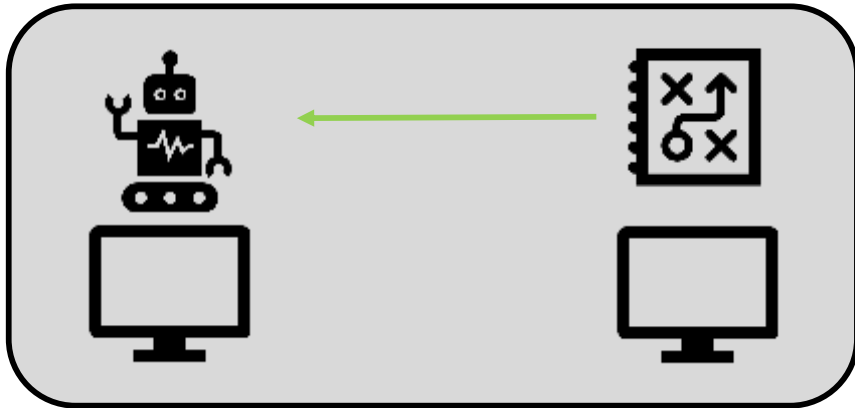
Stable process

Stable systems

Many users



An introduction to RPA



An introduction to RPA

Improve

Customer experience

Employee experience

Compliance

Quality

Time to value

Digital agility



An introduction to RPA

Benefits

10+ times faster

100% accurate

Rapid ROI

Non-intrusive

Quick implementation

Reduce backlog



RPA vendors



Some background information



The poster is titled "Upcoming Events" and features the "PROJECTING SUCCESS" logo in the top right. On the left, it says "LONDON Meetup" with a QR code. The central graphic has the text "HOW WILL ROBOTIC PROCESS AUTOMATION CHANGE HOW WE DELIVER PROJECTS?" and lists speakers: "Presented by David Gray, Project Director" and "Moderated by". It also includes the date and time: "Wednesday 12th June 18:30 - 20:30" and the location: "London, UK at South of River 603M / 18th". Logos for Balfour Beatty, Datafriend, and Kier are at the bottom. A QR code is on the left. Below the poster, there is a list of bullet points and a question.

Upcoming Events

LONDON Meetup

HOW WILL ROBOTIC PROCESS AUTOMATION CHANGE HOW WE DELIVER PROJECTS?

Presented by David Gray, Project Director

Moderated by

Wednesday 12th June 18:30 - 20:30

London, UK at South of River 603M / 18th

- Case studies and worked examples
- From the easy to the complicated
- Working beyond RPA and exploiting data science

Are there any corporates who would like some free consultancy, on the proviso we can use it as a demo?

Consultancy delivered in partnership with: PROJECTING SUCCESS

- Demonstrate the power of RPA to the community
- Test different technology stacks and IT systems to solve different business problems
- Refine our RPA roadmap

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The use cases for today:

- **Projecting Success** – Processing employee timesheets
- **KIER** – BIM models
- **Data Friends** – Web scraping data
- **Balfour Beatty** – Automating document naming conventions
- **Osborne** – Optimising how to process delivery notes

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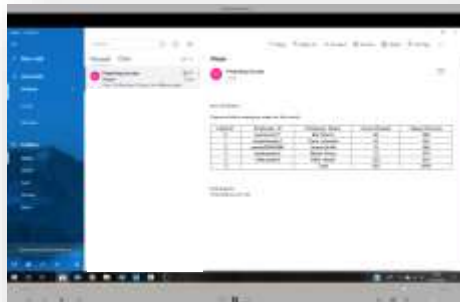
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Projecting Success – Processing employee timesheets.



- Projecting Success – Processing employee timesheets.



The issues..



- Approximately 40 hours a year



- Complicated process with 3 systems working in conjunction

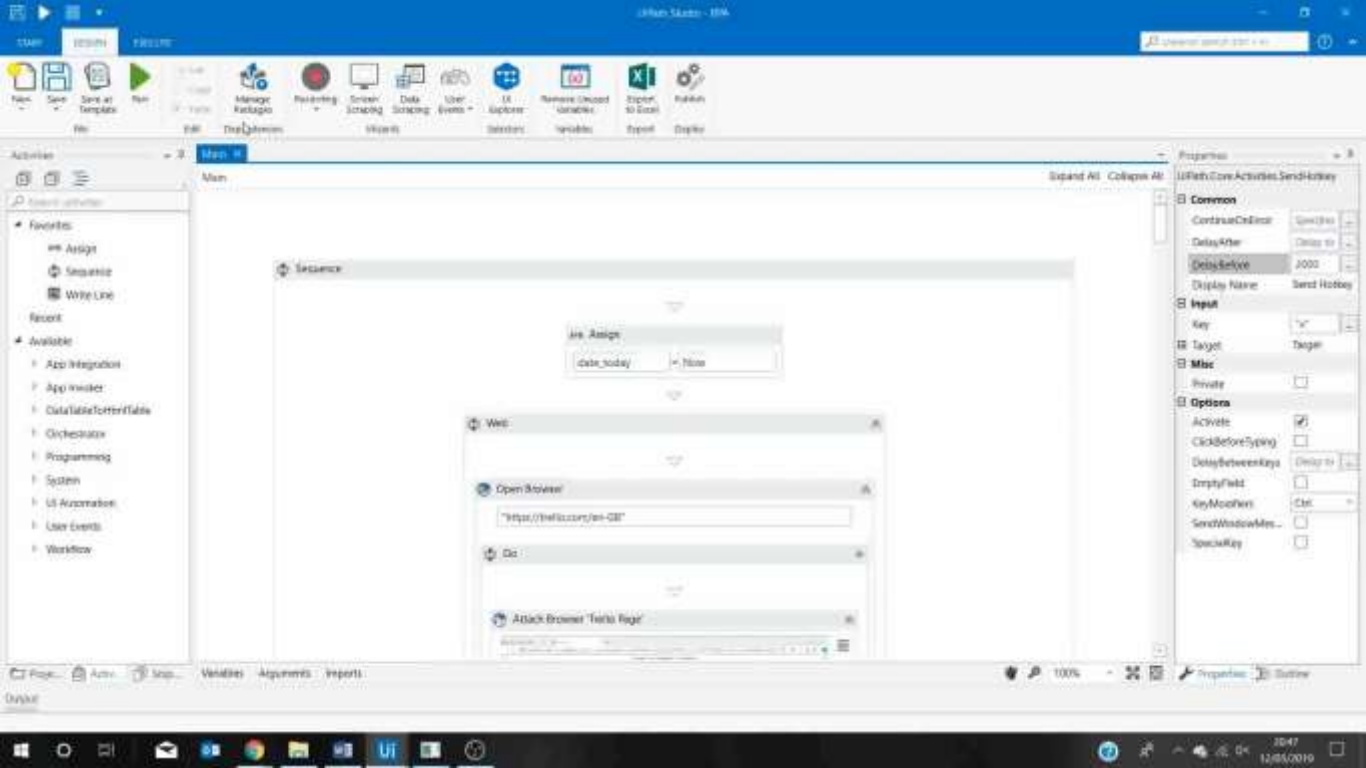


- Vital that mistakes are not made as people's pay is at stake



- Easy to miss obvious mistakes from employees







The benefits...



~~• Approximately 40 hours a year~~



• Reduced to 0 hours a year



~~• Complicated process with 3 systems working in conjunction~~



• No need to login or interact with any systems



~~• Vital that mistakes are not made as people's pay is at stake~~



• The chance for error is reduced with the human removed



~~• Easy to miss obvious mistakes from employees~~



• Python script checks to look for unusual activity. Because it's Python, this can be as extensive as you want!



- Adapt Python script to find more anomalies.
- Schedule the process that it can run in an un-assisted way



▪ **Projecting Success** – Processing employee timesheets.



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- **KIER** – BIM models.



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71 step process.

Key steps are detailed below:

- Log into BIMXtra



- Login to email to retrieve 2 factor authentication code
- Process email to uncover 2 factor code and enter in to website

- Download updated models



- The model navigates through BIMXtra to the right location
- A feature can be added to download the models that are required

- Extract these models



- Extracting models to various locations for, not only "LIVE" models but also for archiving, Improving on KIER's current system

- Open live smc file in Solibri and update models



- Save smc file to archive and "LIVE" folder



- Send email to team



- Navigate to the live SMC file
- Open the file within the Solibri software
- Potentially massive loading times have to be dealt with

- Saving two copies of the process

- Even the automation of the emailing of the team can be completed



The issues..



- Approximately 150 hours a year (per project)

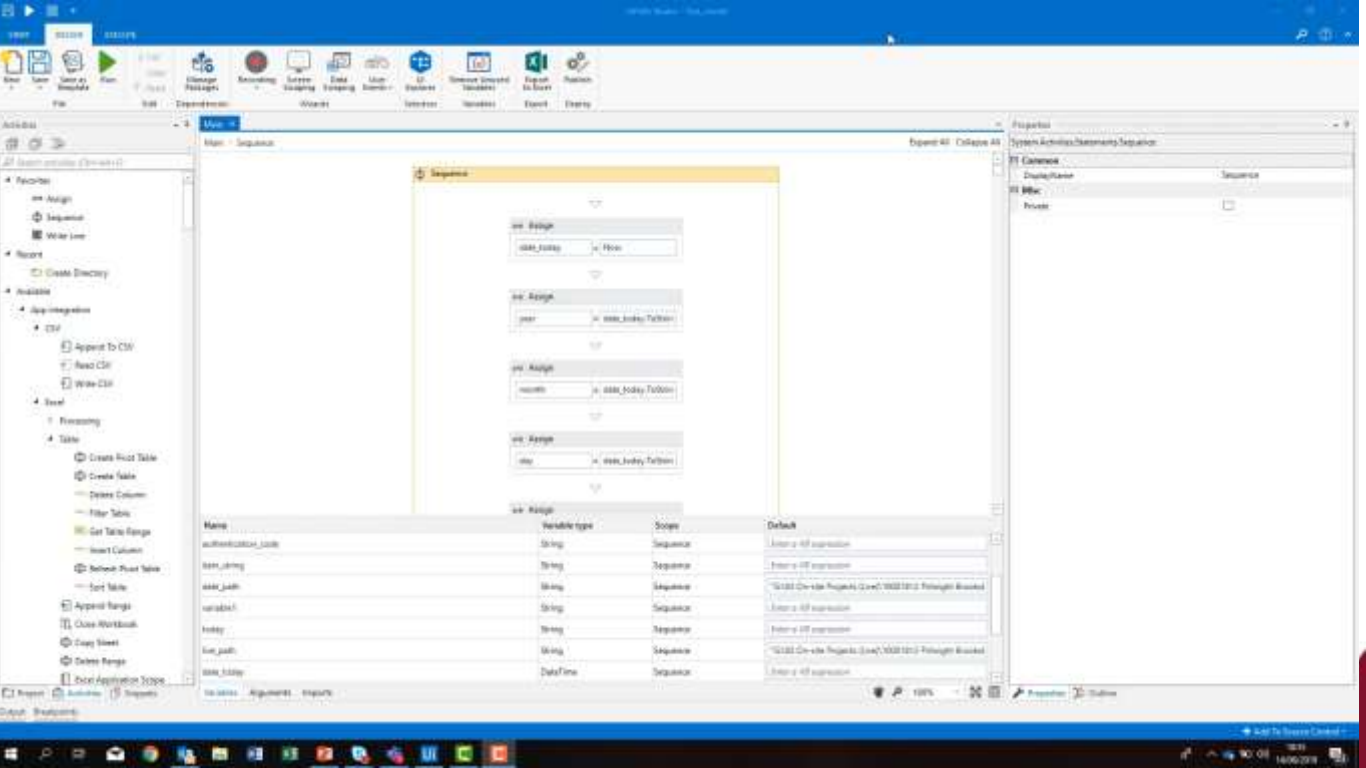


- Complicated process with 3 systems working in conjunction



- Vital that the team is kept up to date







The benefits...



• ~~Approximately 150 hours a year (per project)~~



• Reduced to 0 hours a year



• ~~Complicated process with 3 systems working in conjunction~~



• No need to login or interact with any systems



• ~~Vital that the team is kept up to date~~



• Process can be scheduled to run as and when you want



- Add functionality to choose which project to download the models for



The use cases for today:

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- **Data Friends** – Web scraping data.



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<https://www.wgea.gov.au/public-reports>

• **Data Friends** – Web scraping data.

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The issues..



- 5,000 records. One minute to manually download a record



- £500 to complete this manually



- Can use Python but coding experience is needed



- Protected websites can be a problem



The screenshot shows the UiPath Studio interface. The main workspace displays a sequence of two activities: 'Data Scraping' and 'Invoke Power Shell'. The 'Invoke Power Shell' activity is selected, and its properties are visible in the right-hand pane. The properties include 'ContinueOnError' set to 'True', 'Display Name' set to 'Extract Struct', 'Input' set to 'ExtractMetadata', 'Target' set to 'Target', 'Private' set to 'False', 'DelayBetweenPage...' set to '10', 'MaximumOfPests...' set to '50', 'NextLinkSelector' set to 'nextlink', 'SendWindowMessa...' set to 'False', and 'SimulateClick' set to 'True'. The 'Output' section shows 'DataTable' with a dropdown menu.

Below the activity list, there is a table with the following columns: Name, Variable type, Scope, and Default.

Name	Variable type	Scope	Default
ExtractDataTable	DataTable	Data Scraping	New System, Dat
Create Variable			

The screenshot shows a web browser displaying a public report for two companies. The first company is 'A B Oxford Managers Proprietary Limited' with ABN: 21005649164, Industry: Transport, Postal and Warehousing, State: VIC, and Number of Employees: 123. The second company is 'A B Paterson College Limited' with ABN: 38010996997, Industry: Education and Training, State: QLD, and Number of Employees: 229. Both reports have a reporting period of 2017-2018 and a download report PDF link.

A B Oxford Managers Proprietary Limited
 ABN: 21005649164
 Industry: Transport, Postal and Warehousing
 State: VIC
 Number of Employees: 123
 Reporting Period: 2017-2018
[Download Report \(PDF - 335.6 KB\)](#)

A B Paterson College Limited
 ABN: 38010996997
 Industry: Education and Training
 State: QLD
 Number of Employees: 229
 Reporting Period: 2017-2018
[Download Report \(PDF - 338.95 KB\)](#)

The benefits...



- ~~5,000 records. One minute to manually download a record~~



- Now takes 1 hour (unattended)



- ~~£500 to complete this manually~~



- Now this can run in the background



- ~~Can use Python but coding experience is needed~~



- If you know what you're doing - takes minutes to setup with UiPath studio



- ~~Protected websites can be a problem~~



- Uipath can easily login and is actually uses a browser



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- Schedule task to run periodically
- Performance could be improved by removing UiPath “pauses”



• Data Friends – Web scraping data.

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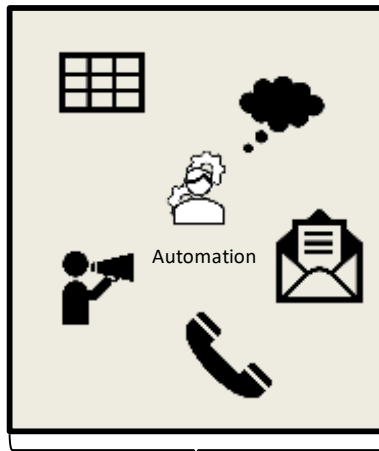
- Balfour Beatty – Automating document naming conventions.



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ProjectWise



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* Balfour Beatty – Automating document naming conventions.

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The issues..



- Immensely time consuming. Multiple projects which require numerous document numbers



- Lots of emails back and forward looking for information. Document Controller is not aware of nuance of each project. Projects are also based on numerous sites. Time is money!



- Duplicates have been created because of a process breakdown

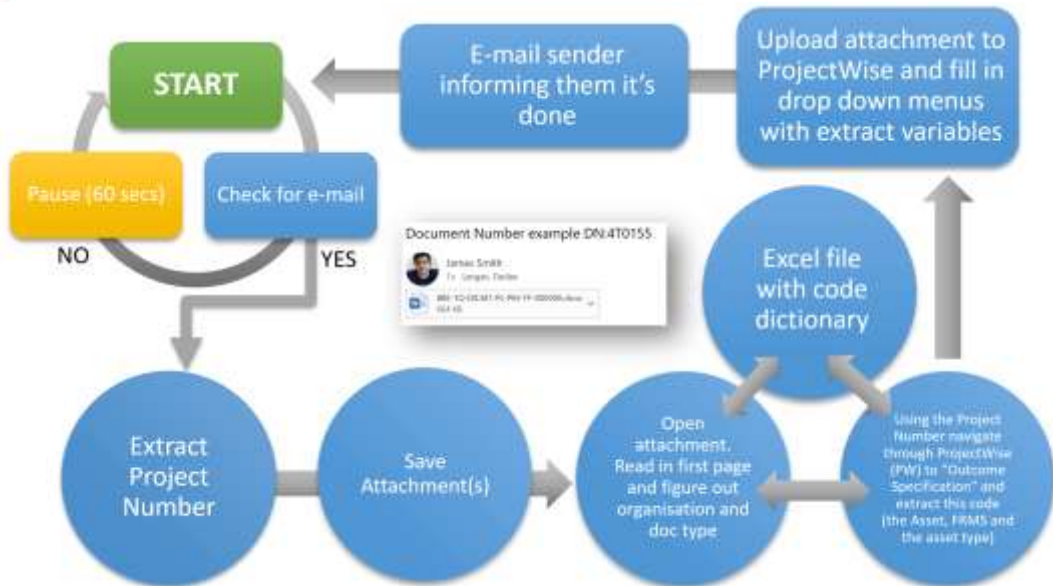


* Balfour Beatty – Automating document naming conventions.

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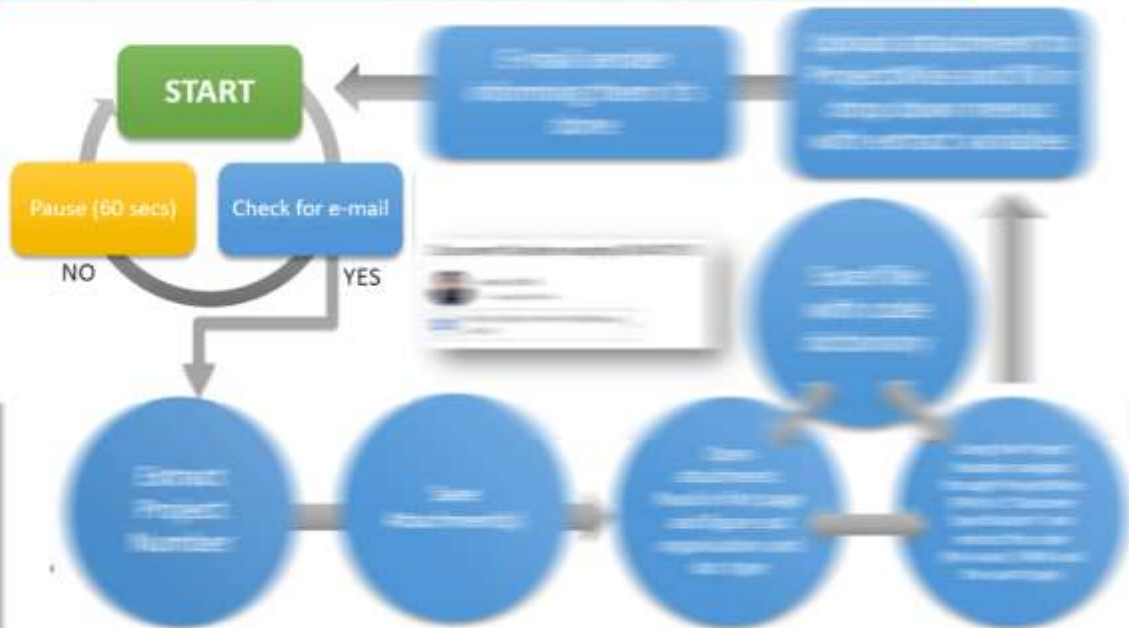


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* Balfour Beatty – Automating document naming conventions.

Automating document naming conventions



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The benefits...



• Immensely time consuming



• Lots of emails back and forward looking for information. Time is money!



• Duplicates have been created because of a process breakdown



• Process automated end-to-end



• Number of enquires massively reduced. Time is money!



• Old files can be run through the system to clear the backlog

* Balfour Beatty – Automating document naming conventions.

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- Increase the number of “document types” that the bot can handle
- Performance could be improved by removing UiPath “pauses”
- Further processes can be added to increase automation
- Increase the robustness of the model by doing more testing



* Balfour Beatty – Automating document naming conventions.

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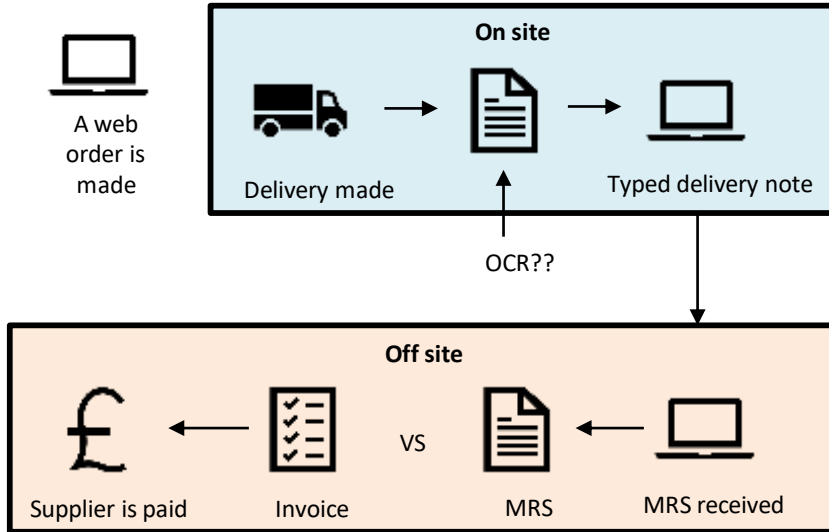
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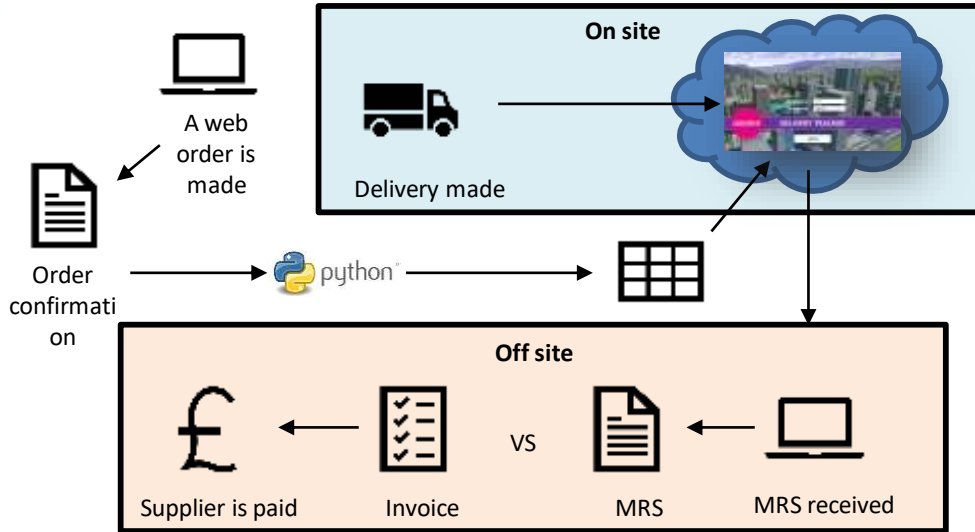
Construction company working within rail, road housing and healthcare sectors.

In 2018 Osborne had:

- **166** live projects
- Submitted **4757** orders
- Ordered **16,499** individual line items







The issues..



- Approximately **2,000** hours a year



- Process costs **£80,000** per year



- An on-site member has to spend time typing out the delivery note. This can be demotivating for employees



- Errors are made when copying the delivery note. This has a HUGE knock on effect when the office try to work out what has been delivered



```

@ tabula-pdf_v1.py x @ 11:00pm x
C:\Users\jerry> Projecting Successful - RAW - Documents - Desktop - Osborne - code - tabula-pdf_v1.py - test.pdf
1 from tabula import read_pdf
2 from time import time
3
4 filename = "test_order"
5
6 raw = parser.from_file("../orderconfirmation/" + filename + ".pdf")
7 raw = str(raw)
8
9 safe_text = raw.encode("utf-8", errors="ignore")
10
11 safe_text = str(safe_text.replace("\n", "").replace("\r", ""))
12
13 of = read_pdf("../orderconfirmation/" + filename + ".pdf", multiple_tables=False)
14
15 of["Purchase Order"] = safe_text.split("Purchase Order Number: ")[1].split("\n")[0]
16 of["Supplier"] = safe_text.split("New: ")[1].split("\n")[0]
17
18 print(of)
19
20 with open("../test/test_order.txt", "w") as g:
21     g.write(safe_text)
22
23 with open("../test/materials.txt", "w") as f:
24     of.to_csv(f, header=True, time_terminated=True)
25
26 print("New was Order ID: ", safe_text.split("New was Order ID: ")[1].split("\n")[0])
27
28
29
30
31
32
33
34

```



DELIVERY TRACKER



LOGIN

The benefits...



• ~~Approximately 2,000 hours a year~~



• This will now be massively reduced



• ~~Process costs £80,000 per year~~



• This will now be massively reduced



• ~~An on-site member has to spend time typing out the delivery note. This can be demotivating for employees~~



• No typing out delivery notes anymore so employees feel more valued. Improving morale



• ~~Errors are made when copying the delivery note. This has a HUGE knock on effect when the office try to work out what has been delivered~~



• As order confirmations are now digital there are no errors processing this data

- Add the option to upload documents
 - Save time photocopying
 - Reduce the chance that these files are lost
- Add functionality for parts of the delivery on backorder
- Expand the scope of the Python script to cope with more suppliers
- Create Python script to convert invoices in to data
- Create UiPath process that automatically compares MRS with extracted data from invoices



1. Demonstrate the power of RPA to the community
2. Test different technology stacks and IT systems to solve different business problems
3. Refine our RPA roadmap



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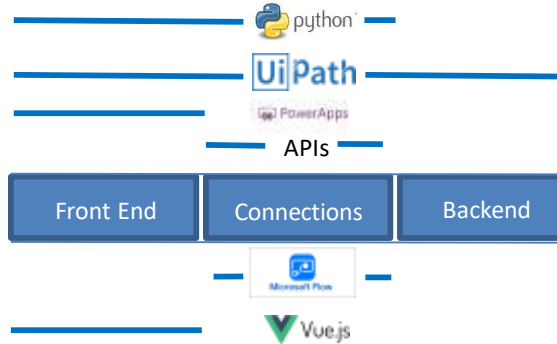
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- Osborne – Optimising how to process delivery notes.



2. "Test different technology stacks and IT systems to solve different business problems"



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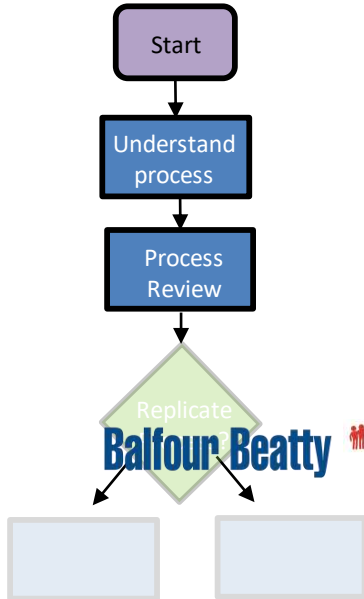
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3. "Refine our RPA roadmap"

RPA is not just process replication, it's more than that, we optimise your process by doing a **process review** so it's more:

1. Efficient
2. Robust
3. Timely

+ Previously unforeseen benefits
(preparation for Machine Learning)



Thank you

Please find me on LinkedIn

Thank
You!

LinkedIn

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