Airflow @ Monzo

Evolving our Data Platform as the Bank Scales

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Backend Engineer
(Data Platform)

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Senior Backend Engineer
(Data Platform)
Making Money Work For Everyone

Who are we?

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History of Data at Monzo

Number of Models

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Models</td>
<td>3</td>
<td>3</td>
<td>1319</td>
<td>3400</td>
<td>4831</td>
<td>6439</td>
<td>8421</td>
</tr>
</tbody>
</table>

Number of Employees in Data Discipline

<table>
<thead>
<tr>
<th>Year</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
<th>2023</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees</td>
<td>2</td>
<td>7</td>
<td>29</td>
<td>38</td>
<td>108</td>
<td>120</td>
<td>134</td>
</tr>
</tbody>
</table>
- Dags dynamically defined using dbt model selectors
- SQL pre-rendered in CI by dbt and run in Airflow with Python + BigQuery SDK
- Final DAG defined at runtime by building the graph from the model selector and interleaving python workloads
- BigQuery copy optimisation for shard merging
- Indirect selects allow configurable cross DAG dependencies
Retrying Transient Errors

- Failure is inspected via callback and for certain classes of failure tasks are scheduled for retry
- Subsequent successes unblock pipelines automatically and enable us to meet SLAs
- Allow models on our core path alert to a common shared channel on failure
- Persistent failures trigger our internal paging system

Automatic Retry
Notifying for quick incident identification

- Model owners can configure how and where they want to be notified when their models are run

- Contextual information to enable debugging is threaded

- Model degradation notifications

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Calculating Critical Paths From DAGs

- We want to ensure that our DAGs don’t degrade in performance

- We built tooling to retrieve Airflow DAGs and then calculate their critical paths to focus optimisations
Landing Times From Critical Paths

- Our SLOs are based on model landing times
- We can re-use our critical path calculations, combined with estimates to give estimates on when a model will complete
Exposing Our Tools

- We expose our tools via a Slack App to reduce the bar to entry for Data Discipline Members
- You can clear tasks, get statuses and estimate landing times
- Potentially destructive tasks (clearing tasks) protected by Multi Party Approval

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Moving Forwards

Airflow Upgrades
We’d like to upgrade from 2.3.4 to take advantage of new features.

Further Cost Reductions
Autoscaling
Deferrable Operators & Triggers

dbt Upgrades & Better DAG Build
We would like to move to 1.5
Questions?

Optionally share some contact info like email, blog or social media handles
How to navigate this deck:

- Section 1 - Title slides
- Section 2 - Written content
- Section 3 - Tables & Timelines
- Section 4 - Using Emojis
- Section 5 - Using Graphs

When using the pill, please try keep the copy as short as possible and on one line. If necessary please extend the pill rather than drop copy onto second line.
1. Title slides

Below you will find a section of title slides to choose from.
Hero title goes here
Title slide

You can use these slides to break up your presentation into sections
Longer headline copy written across two lines

Sub title copy
Headline message

Short intro to paragraph (H3)

This space can be used to speak in detail about your work. The paragraphs are broken down into two sections to allow for easy reading. The use of a shorter line length makes the copy more digestible.

By pressing the enter key you can create a paragraph break. The shorter we can keep copy the better.

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By pressing the enter key you can create a paragraph break. The shorter we can keep copy the better.
This space could be used as a short introduction to your presentation.
Title slide
You can use these slides to break up your presentation into sections
1,000,000+ customers
2. Written content

Below you will find a section slides which can be used to display copy.
Longer headlines can run across two lines

Short intro to paragraph (H3)

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By pressing the enter key you can create a paragraph break. The shorter we can keep copy the better.
1
Space for copy step 1
Moving away from agencies and growing our capabilities to help us power growth

2
Space for copy step 2
Moving away from agencies and growing our capabilities to help us power growth

3
Space for copy step 3
Moving away from agencies and growing our capabilities to help us power growth
Goals for next meeting.

1. Short and concise steps can help the reader digest information. Bring them on your journey.

2. Short and concise steps can help the reader digest information. Bring them on your journey.

3. Short and concise steps can help the reader digest information. Bring them on your journey.

4. Short and concise steps can help the reader digest information. Bring them on your journey.
We’re a species of skim readers. We’ve got more to read than any humans in history, on smaller and smaller screens, with less and less time to do it. So one of our toughest jobs is just to hold people’s attention.

That’s where subheadings come in.
Longer headlines can run across two lines

Subheader paragraph (H3)
We’re a species of skim readers. We’ve got more to read than any humans in history, on smaller and smaller screens, with less and less time to do it. So one of our toughest jobs is just to hold people’s attention.

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Subheader paragraph (H3)
We’re a species of skim readers. We’ve got more to read than any humans in history, on smaller and smaller screens, with less and less time to do it. So one of our toughest jobs is just to hold people’s attention.
With this slide you should be able to take these steps (H4)

1. Write in steps about your process and the journey. Use these blocks of text to bring the reader on a journey. Help them understand your process by walking them through the steps you took.

2. Write in steps about your process and the journey. Use these blocks of text to bring the reader on a journey. Help them understand your process by walking them through the steps you took.

3. Write in steps about your process and the journey. Use these blocks of text to bring the reader on a journey. Help them understand your process by walking them through the steps you took.
Developing longer headline copy examples

Short intro to paragraph (H4)

On slides with large imagery you can insert any image you like. Simply click the Hot Coral square, then click the “replace image” button and choose your new image you would like to insert.
Short lists of bullet points

Our advice on bullet points is pretty simple. Big lists of bullets are no easier to read than big blocks of text. So they should be:

- Text size drops to 11.5
- Spacing set to 1.5
- No more than a (short) sentence
- Under 6 per list
- Use two columns if needed
- Related to each other
- Consistent in style
What you want to say, in steps

1. Short and concise steps can help the reader digest information. Bring them on your journey.
2. Short and concise steps can help the reader digest information. Bring them on your journey.
3. Short and concise steps can help the reader digest information. Bring them on your journey.
4. Short and concise steps can help the reader digest information. Bring them on your journey.
Short lists of bullet points

Our advice on bullet points is pretty simple. Big lists of bullets are no easier to read than big blocks of text. So they should be:

- Text size drops to 16
- Spacing set to 1.5
- No more than a (short) sentence
- Under 6 per list
“Including a quote: Monzo changed my life, I am finally in control of my spending and it feels great!”

– Jake Peralta
HELLO
MY NAME IS
Name Here
And I'll be joining the Xxxxxxxxxxxx team

To replace the above image, just select the box and select the "replace image" tab above.

You can use this space for a little blurb about the new starter.
3. Tables & timelines content

Below you will find a section of slides which can be used to display information within tables and timelines to take the viewer on a journey.
<table>
<thead>
<tr>
<th>Level</th>
<th>Category 1</th>
<th>Category 2</th>
<th>Category 3</th>
<th>Category 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1</td>
<td>7.895</td>
<td>5.874</td>
<td>9.670</td>
<td>2.565</td>
</tr>
<tr>
<td>Level 3</td>
<td>4.663</td>
<td>2.668</td>
<td>8.437</td>
<td>9.548</td>
</tr>
</tbody>
</table>
March
Sub copy section
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

April
Sub copy section
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

May
Sub copy section
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

June
Sub copy section
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.

July
Sub copy section
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
Lorem ipsum dolor sit amet, consectetur adipiscing elit.
With this slide you should be able to take these steps (timeline)

Write in steps about your process and the journey. Use these blocks of text to bring the reader on a journey. Help them understand.

→

Write in steps about your process and the journey. Use these blocks of text to bring the reader on a journey. Help them understand.

→

Write in steps about your process and the journey. Use these blocks of text to bring the reader on a journey. Help them understand.

→

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→

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## Breaking content into categories

### Short intro to paragraph (H4)

On slides with large imagery you can insert any image you like. Simply click the Hot Coral square, then click the "replace image" button and choose your new image you would like to insert.

<table>
<thead>
<tr>
<th>Category</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>one</td>
<td>Lorem ipsum dolor sit amet. Quo tempora placeat aut enim blanditiis et voluptas eius aut architecto eaque eos quia corrupti</td>
</tr>
<tr>
<td>two</td>
<td>Lorem ipsum dolor sit amet. Quo tempora placeat aut enim blanditiis et voluptas eius aut architecto eaque eos quia corrupti</td>
</tr>
<tr>
<td>three</td>
<td>Lorem ipsum dolor sit amet. Quo tempora placeat aut enim blanditiis et voluptas eius aut architecto eaque eos quia corrupti</td>
</tr>
<tr>
<td>four</td>
<td>Lorem ipsum dolor sit amet. Quo tempora placeat aut enim blanditiis et voluptas eius aut architecto eaque eos quia corrupti</td>
</tr>
<tr>
<td>five</td>
<td>Lorem ipsum dolor sit amet. Quo tempora placeat aut enim blanditiis et voluptas eius aut architecto eaque eos quia corrupti</td>
</tr>
</tbody>
</table>
What you want to say (H4)

With this slide you can insert four images. You can insert any image you like. Simply click the Hot Coral square, then click the “replace image” button and choose your new image you would like to insert.

Write in steps about your process and the journey. Use these blocks of text to bring the reader on a journey. Help them understand

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Write in steps about your process and the journey. Use these blocks of text to bring the reader on a journey. Help them understand
Category One

Category Two

Category Three

Category Four

Category Five

Category Six

Sub copy section
4. Using Emojis and illustrations

Below you will find a section of slides which explains how we can best use emojis and illustrations in our presentations.
Emojis set us apart and reflect what we're like as people: colourful, friendly and open to new ideas. So feel free to use them, especially if it helps the slide.
Using emojis

Emojis can help to break up copy and create a visual aid for your point.

To use more emojis you can use https://emojipedia.org/.
Simply type in your keyword and then copy the Emoji and paste it into the doc.
5. Using Graphs

Below you will find a section of slides which allows you to drop in your graphs and add a description. These slides use a whistle background, allowing you to drop in screenshots of your charts, graphs etc.
Pie chart example

Sub header

Most charts will tend to be created outside of slides and imported in on a white background. To insert your own chart you can click on the existing image, select “replace image” from the button above, and then choose your replacement image from your computer.
Space for a tag-line where you can give context for the graphs and help the viewer understand.
Space for a tag-line where you can give context for the content and help the viewer understand.
5. Mockups