



# **Better Customer Experiences with AI/ML and Generative AI**

## **Domain Adaptation**

Justin Muller

Generative AI Sr. Solutions Architect

# Justin Muller

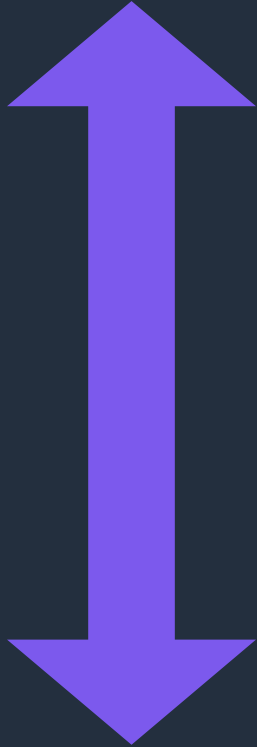
- Degrees in Physics, Math, Law, & Business
- 13+ years experience in NLP
- 3+ years experience in Gen AI
- 20+ AWS Gen AI customers supported this year
- 3 kids (7, 4, 2)



**Domain Adaptation is  
the process of modifying  
generative AI to work  
for your business.**

# Which option is right for my use case?

Easy to Build  
Lowest cost



Hard to Build  
High Cost  
High level of customization

- No changes
- Prompt engineering
- Retrieval augmented generation & agents
- Fine tune or Pre-train an existing model
- Build a foundation model from scratch



**Answer: Start from the top!**

# Which option is right for my use case?

## Prompt:

Please summarize that meeting.

- No changes
- Prompt engineering
- Retrieval augmented generation & agents
- Fine tune or Pre-train an existing model
- Build a foundation model from scratch

**Additional Cost:**  
None.



# Which option is right for my use case?

## Prompt:

Please summarize that meeting. **Be Concise.**

- No changes
- Prompt engineering
- Retrieval augmented generation & agents
- Fine tune or Pre-train an existing model
- Build a foundation model from scratch

## Additional Cost:

Very low. May save \$\$\$!



# Example: Think about talking to a child.

Prompt: Put the cushions back on the couch.



## Example: Think about talking to a child.

Prompt: Put the cushions back on the couch **right side up**.



**Answer: Get the LLM do do what you want!**



# Example: Customer Information

## Prompt:

<Customer Information>

...

</Customer Information>

Based on my customer information,  
can I afford a new laptop for \$300?

## Response:

Based on the information provided, it looks like **you have \$1042 in available funds** across your checking and savings accounts. So purchasing a \$300 laptop **should be within your budget**. However, I do not have a full view of your income, expenses, debt obligations, and other financial responsibilities. So while it appears you can afford a \$300 laptop based on your account balances alone, you would want to make sure that such a purchase still fits within your overall financial situation and priorities. If you have concerns about your ability to afford the laptop after factoring in your complete financial picture, you may want to consider less expensive options or saving up additional funds first.

# Example: Customer Information

Prompt:

<Customer Information>

...

</Customer Information>

Customer: Can I afford a new laptop for \$300? **Be concise.**

Response:

**Yes.**

# Which option is right for my use case?

One of the most common places to start; We'll come back to this.

- No changes
- Prompt engineering
- Retrieval augmented generation & agents
- Fine tune or Pre-train an existing model
- Build a foundation model from scratch

# Which option is right for my use case?

## Pros:

May generate cost savings  
May open new use cases

## Cons:

High start up cost, complex,  
easy to get wrong

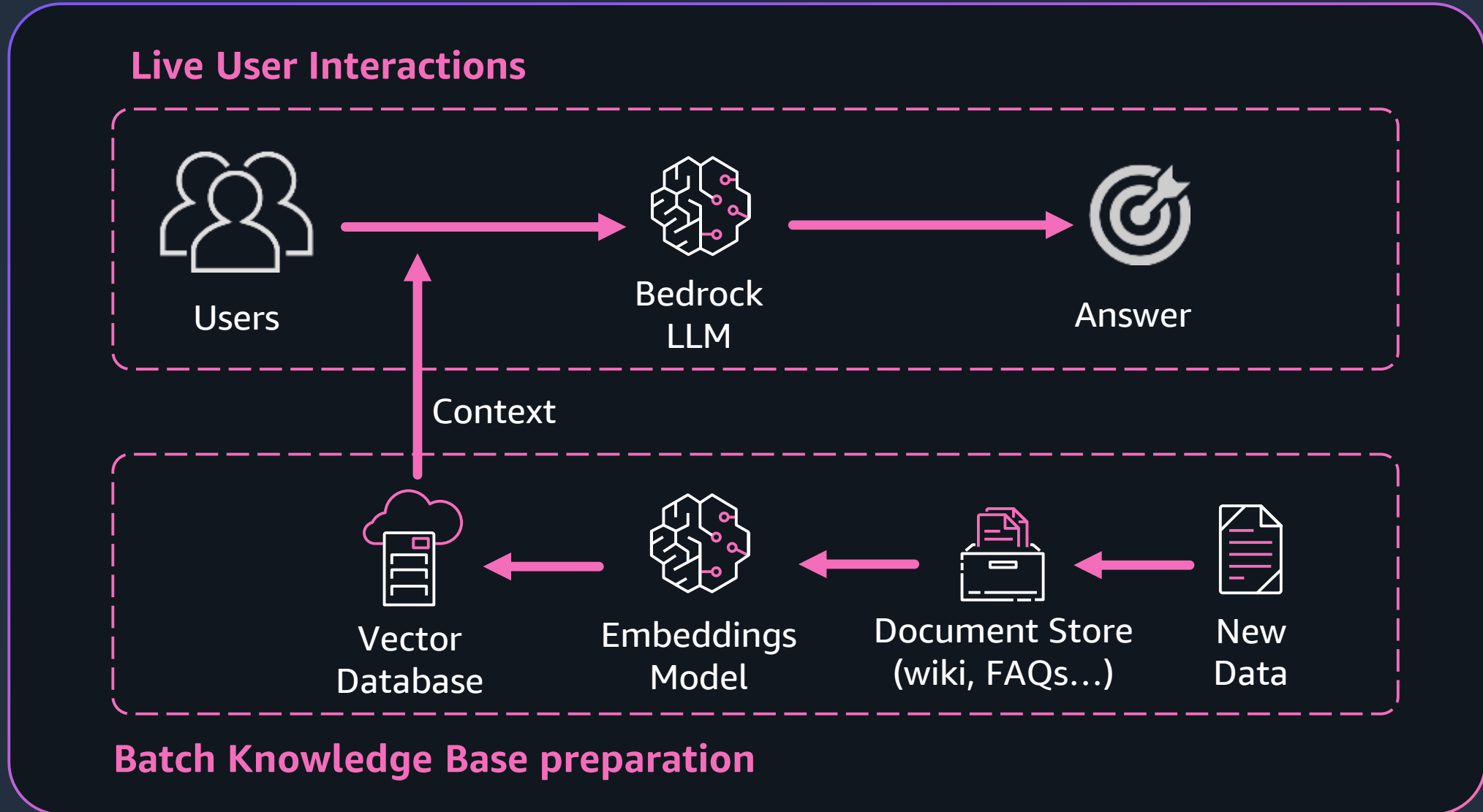
- No changes
- Prompt engineering
- Retrieval augmented generation & agents
- Fine tune or Pre-train an existing model
- Build a foundation model from scratch

# Which option is right for my use case?

Very common,  
will see in demos

- No changes
- Prompt engineering
- Retrieval augmented generation & agents
- Fine tune or Pre-train an existing model
- Build a foundation model from scratch

# Retrieval Augmented Generation



**Let's see it in action!**

Amazon Bedrock

Getting started

Overview

Examples

Providers

Foundation models

Base models

Custom models

Playgrounds

Chat

Text

Image

Orchestration

Knowledge base

Agents

Assessment & deployment

Model Evaluation

Provisioned Throughput

Model access

Settings

Amazon Bedrock > Text playground

# Text playground

AI

Claude v2.1

ODT

Change

You are a skilled real estate agent that wants to show of your customer's home by writing the best description possible for posting on popular search sites. Here are the details that should be included:

<details>

- 3bed, 2bath
- nice neighborhood with good schools
- 2 miles from the beach
- recently remodeled kitchen
- pool provided by HOA

</details>

Please write a one paragraph summary that can be used to advertise this home online.

Run

Configurations

Reset

## Randomness and diversity

Temperature 1

Top P 0.999

Top K 250

## Length

Maximum Length 300

Stop sequences

Add



Text playground [Info](#)Claude v2.1 ODT  
[Change](#)

## Configurations

[Reset](#)▼ Randomness and diversity [Info](#)

Temperature

1

Top P

0.999

Top K

250

▼ Length [Info](#)

Maximum Length

985

Stop sequences

[Add](#)

&lt;details&gt;

-3bed, 2bath

-nice neighborhood with good schools

-2 miles from the beach

-recently remodeled kitchen

-pool provided by HOA

&lt;/details&gt;

Please write a one paragraph summary that can be used to advertise this home online.

Assistant:

Here is a one paragraph summary to advertise the home online:

This recently remodeled 3bed, 2bath home is situated in a nice neighborhood with good schools, only 2 miles from the beach. The kitchen has been stylishly updated with modern appliances and fixtures. As part of the homeowners association, enjoy access to a sparkling community pool right around the corner. With its ideal location near schools, the ocean, and amenities, this move-in-ready home has everything you need to enjoy living in comfort and style. Schedule a showing today!



Run



▼ Getting started

Overview

Examples

Providers

▼ Foundation models

Base models

Custom models

▼ Playgrounds

Chat

Text

Image

▼ Orchestration

Knowledge base

Agents

▼ Assessment &amp; deployment

Model Evaluation [Preview](#)

Provisioned Throughput

Model access

Settings



Amazon Bedrock

RAG Diagram

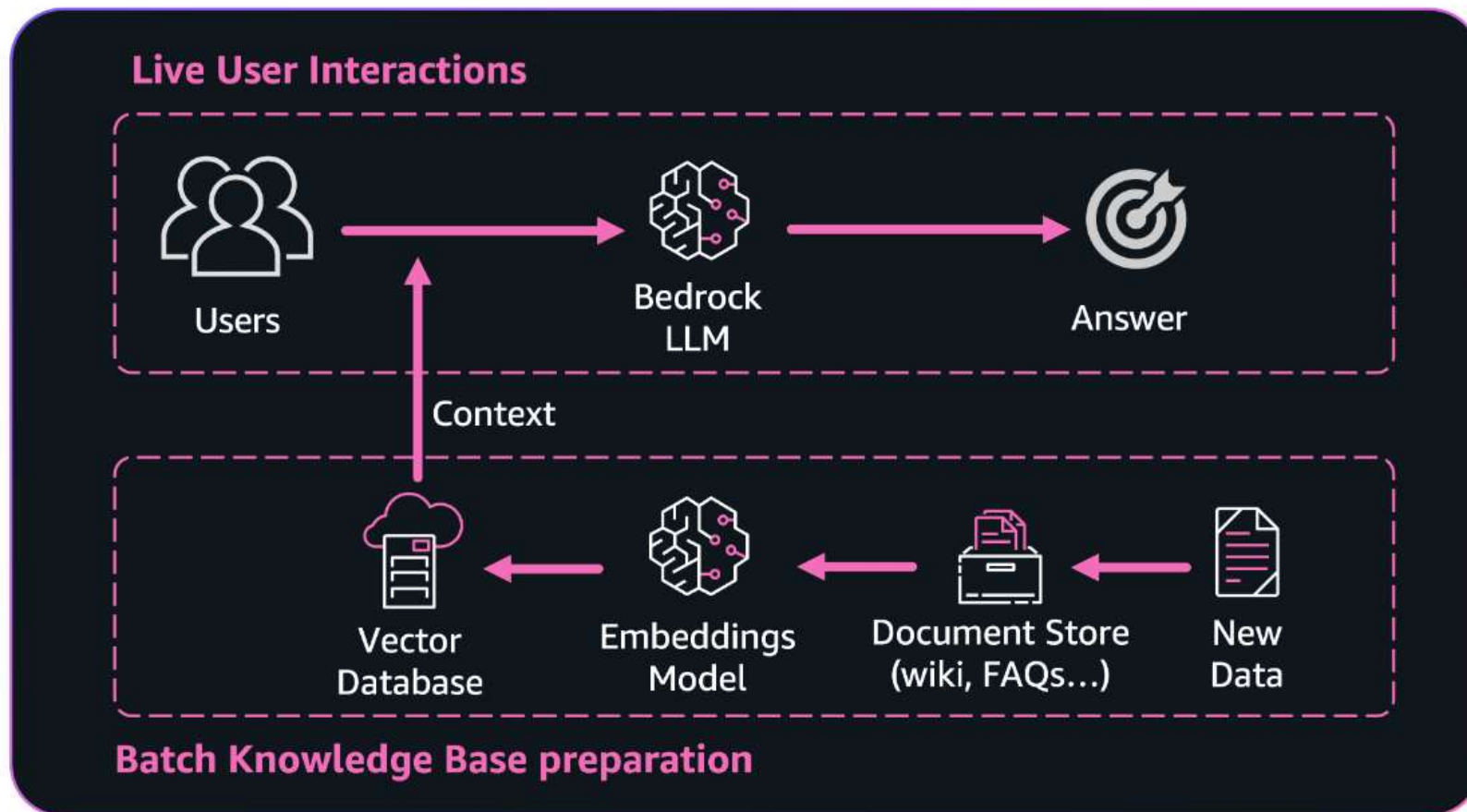
RAG Demo

ETL Demo

SQL Demo



# Retrieval Augmented Generation





Amazon Bedrock

RAG Demo

ETL Demo

RAG Diagram



# Retrieval Augmented Generation

## Context

Customer Question

What can I do at Waikiki Beach if I like country music?

Add Context

- ☐ Event Information
- ☐ Hotel Information
- ☐ Current Flight Status
- ☐ Current Deals
- ☒ Be concise

## Final Prompt

Send to Bedrock

What can I do at Waikiki Beach if I like country music? Be concise.

## Results

Done.

Unfortunately there are no dedicated country music venues at Waikiki Beach. However, you could potentially find live country music at some bars or restaurants in the area. Overall Waikiki Beach is known more for its beautiful beaches, surfing, and Hawaiian culture rather than country music.



Amazon Bedrock

RAG Demo

ETL Demo

RAG Diagram



# Retrieval Augmented Generation

## Context

Customer Question

What can I do at Waikiki Beach if I like country music?

Add Context

- ☒ Event Information
- ☐ Hotel Information
- ☐ Current Flight Status
- ☐ Current Deals
- ☒ Be concise

## Final Prompt

Send to Bedrock

Consider the following context.

<context>

Show Name: Nashville Nights

Show Details: Experience intimate events in a songwriter's format while watching the sunset over Waikiki Beach!

Show Time: 7-930PM October-March

Show Location: Waikiki Beach Marriott Resort courtyard.

</context>

What can I do at Waikiki Beach if I like country music? Be concise.

## Results

Done.

Attend the Nashville Nights show in the Waikiki Beach Marriott Resort courtyard from 7-9:30PM between October and March.





Amazon Bedrock

RAG Demo

ETL Demo

RAG Diagram



# Retrieval Augmented Generation

## Context

Customer Question

Can I stay in a room with walk out access to the beach at the Hilton in Waikiki?

### Add Context

- ☐ Event Information
- ☒ Hotel Information
- ☐ Current Flight Status
- ☐ Current Deals
- ☒ Be concise

## Final Prompt

Send to Bedrock

Consider the following context.

<context>

Name: Hilton Hawaiian Village  
Waikiki Beach Resort

Distance to nearest beach: 1 block

Childcare: Yes

Ocean view rooms: Yes

Unique attraction: saltwater lagoon

</context>

Can I stay in a room with walk out access to the beach at the Hilton in Waikiki? Be concise.

## Results

Done.

No, the Hilton Hawaiian Village in Waikiki is 1 block from the nearest beach, so it does not have rooms with direct walk out access to the beach.



Amazon Bedrock

RAG Diagram

RAG Demo

ETL Demo

SQL Demo

aws

# Transform Qualitative Data

## Raw Data

Help Desk Transcript

- ☒ None  
☐ Example 1  
☐ Example 2

### Instructions

Rate this transcript on a scale from 1 to 100, where 1 is pure deflection, and 100 is pure meaningful answer. Your answer should be in JSON format, with keys for score and reasoning. Be concise. Reasoning should be an array of strings.

Send to Bedrock

## Results

## Dashboarding

Score

0

Reasoning



Amazon Bedrock

RAG Diagram

RAG Demo

ETL Demo

SQL Demo



# Transform Qualitative Data

## Raw Data

### Help Desk Transcript

Guest: Where can I go shopping around here?  
Concierge: Shopping is fun, but it can mean a lot of walking. I don't want you to get tired, so can I call you a cab?

- ☐ None  
☒ Example 1  
☐ Example 2

### Instructions

Rate this transcript on a scale from 1 to 100, where 1 is pure deflection, and 100 is pure meaningful answer. Your answer should be in JSON format, with keys for score and reasoning. Be concise. Reasoning should be an array of strings.

Send to Bedrock

## Results

Done.

```
{"score": 20, "reasoning": ["The concierge does not directly answer the question about where to go shopping", "Instead, the concierge makes an assumption about the guest getting tired and offers to call a cab", "This is deflecting from the original question asked"]}
```

## Dashboarding

Score

20

### Reasoning

- The concierge does not directly answer the question about where to go shopping
- Instead, the concierge makes an assumption about the guest getting tired and offers to call a cab
- This is deflecting from the original question asked



## Amazon Bedrock

RAG Diagram

RAG Demo

ETL Demo

SQL Demo



# Transform Qualitative Data

## Raw Data

Help Desk Transcript

Guest: Where can I go shopping around here?  
Concierge: The Royal Hawaiian Center is an open-air shopping mall just across the street, with over 110 stores and restaurants. It's a great spot to find designer boutiques and souvenirs.

- ☐ None  
☐ Example 1  
☒ Example 2

Instructions

Rate this transcript on a scale from 1 to 100, where 1 is pure deflection, and 100 is pure meaningful answer. Your answer should be in JSON format, with keys for score and reasoning. Be concise. Reasoning should be an array of strings

Send to Bedrock

## Results

Done.

```
{"score": 95, "reasoning": ["The concierge directly answers the guest's question about where to go shopping nearby", "Provides specific details about the shopping mall location, stores and restaurants", "Gives a relevant recommendation tailored to the guest's query"]}
```

## Dashboarding

Score

95

Reasoning

- The concierge directly answers the guest's question about where to go shopping nearby
- Provides specific details about the shopping mall location, stores and restaurants
- Gives a relevant recommendation tailored to the guest's query





Amazon Bedrock

RAG Diagram

RAG Demo

ETL Demo

SQL Demo



# Automatic SQL Generation

## System Input

User Question

What was my total revenue in H2 of 2023?

Instructions

database with a table called sales, which has columns month, year, and total\_sales. Write an SQL query that would retrieve the information required to answer the above question. Put the SQL query in a <sql> tag.

Send to Bedrock

## Intermediate Steps

Done.

```
SELECT SUM(total_sales) AS
total_revenue
FROM sales
WHERE year = 2023 AND month
>= 7 AND month <= 12;
```

Run SQL Query

Done.

(60,)

## Results

Done.

Consider this question.  
<question>  
What was my total revenue in H2 of 2023?  
</question>  
and this SQL statment:  
<SQL>

Send to Bedrock

Done.

The total revenue in H2 of 2023 was 60.

# Thank you!

Justin Muller

[justmul@amazon.com](mailto:justmul@amazon.com)

