goto;

GOTO EDA Day 2022

Codenode | London

September 1st, 2022

aws BROUGHT TO YOU BY AWS AND PARTNERS

Event-driven architectures in practice

Lessons learned building an e-commerce platform in 6 months at cinch

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Engineering Practice Lead
cinch

Emily Shea (she/her)

Head of Application Integration GTM
AWS

</>

We focus a lot on our application's code…

How comfortable are you throwing code out and trying something new?

Building a new feature requires:

- Spinning up infrastructure
- Writing custom integration code
- Coordinating with other teams on changes
- Writing business logic

Today, 80% of developer time is spent in operations and maintenance.*

In the future, the only code you write will be business logic.

*Deloitte, 2019

Building a new feature requires:

- ~~Spinning up infrastructure~~
- ~~Writing custom integration code~~
- ~~Coordinating with other teams on changes~~
- Writing business logic

Building serverless, event-driven architectures lets you build faster and experiment more.

What do we mean by ‘serverless’?

Just upload your code

Automatically scale resources up and down

No server management

Native integrations built-in

What code do you not need to write?

Examples:

- Integrations between services to send and receive events
- Services emit events automatically
- Retry logic and error handling
- Integrations to call AWS service APIs

Amazon EventBridge

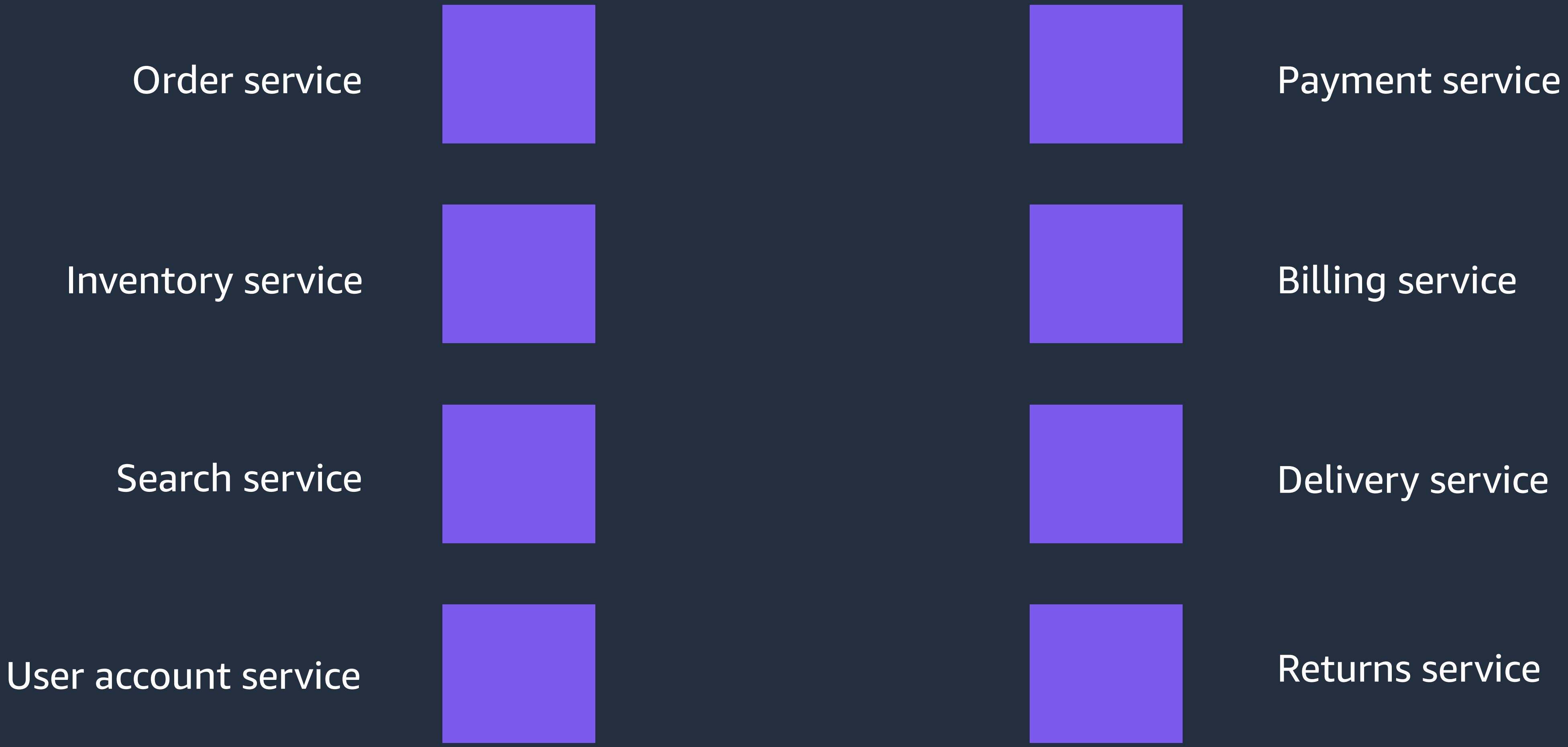
AWS Step Functions

AWS Lambda

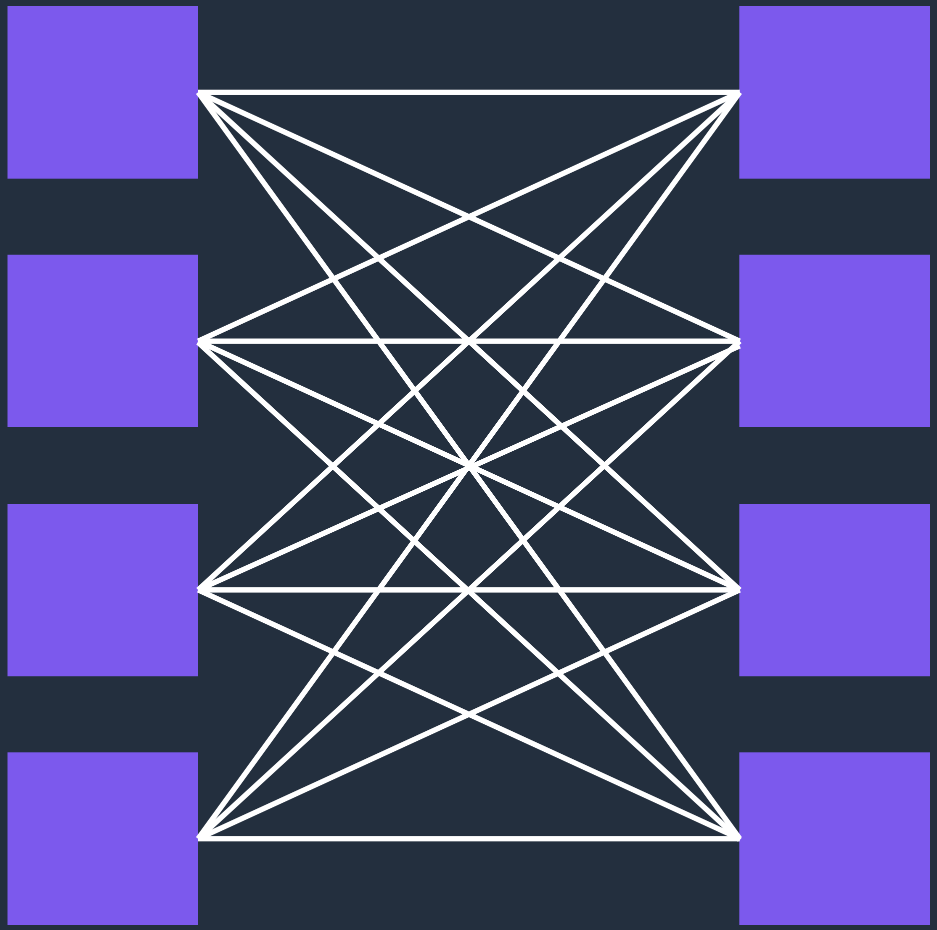
Amazon S3

Amazon DynamoDB

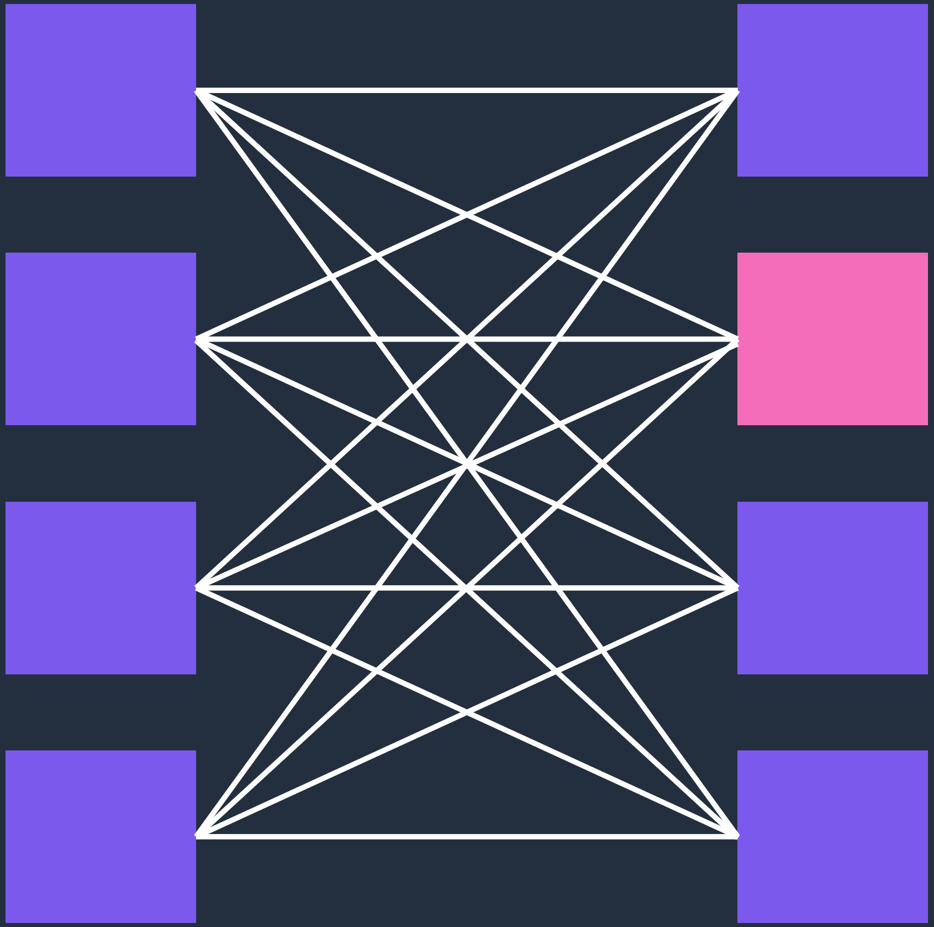
A microservice application



A microservice application



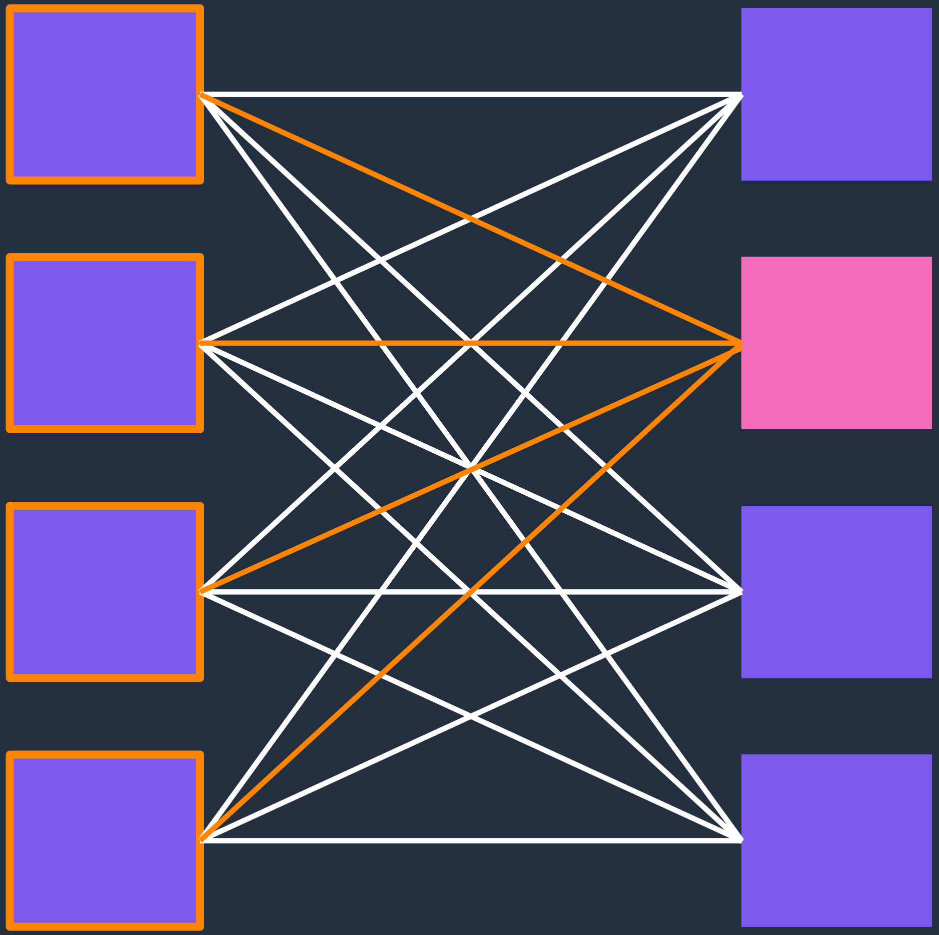
A microservice application



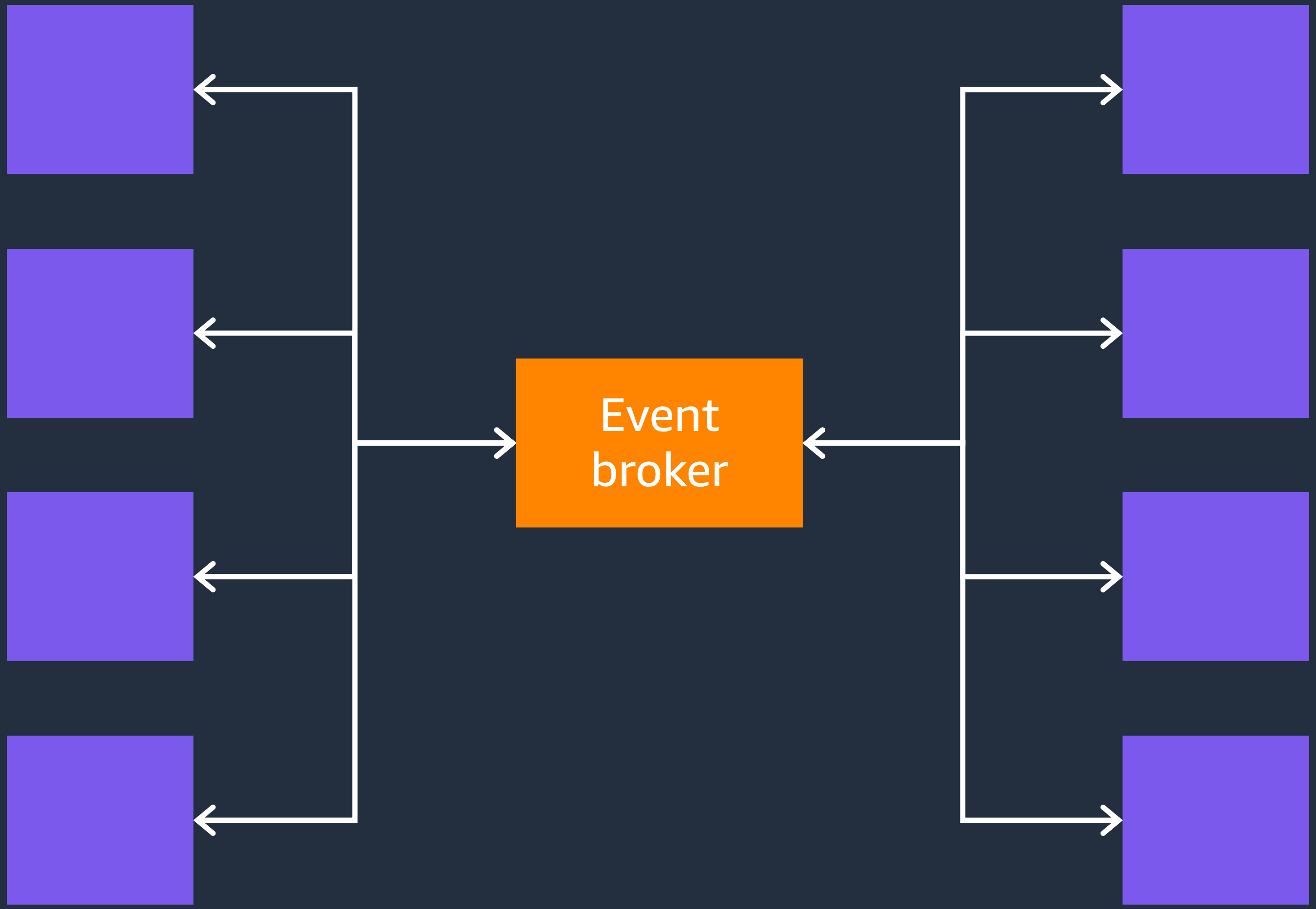
New idea!

A microservice application

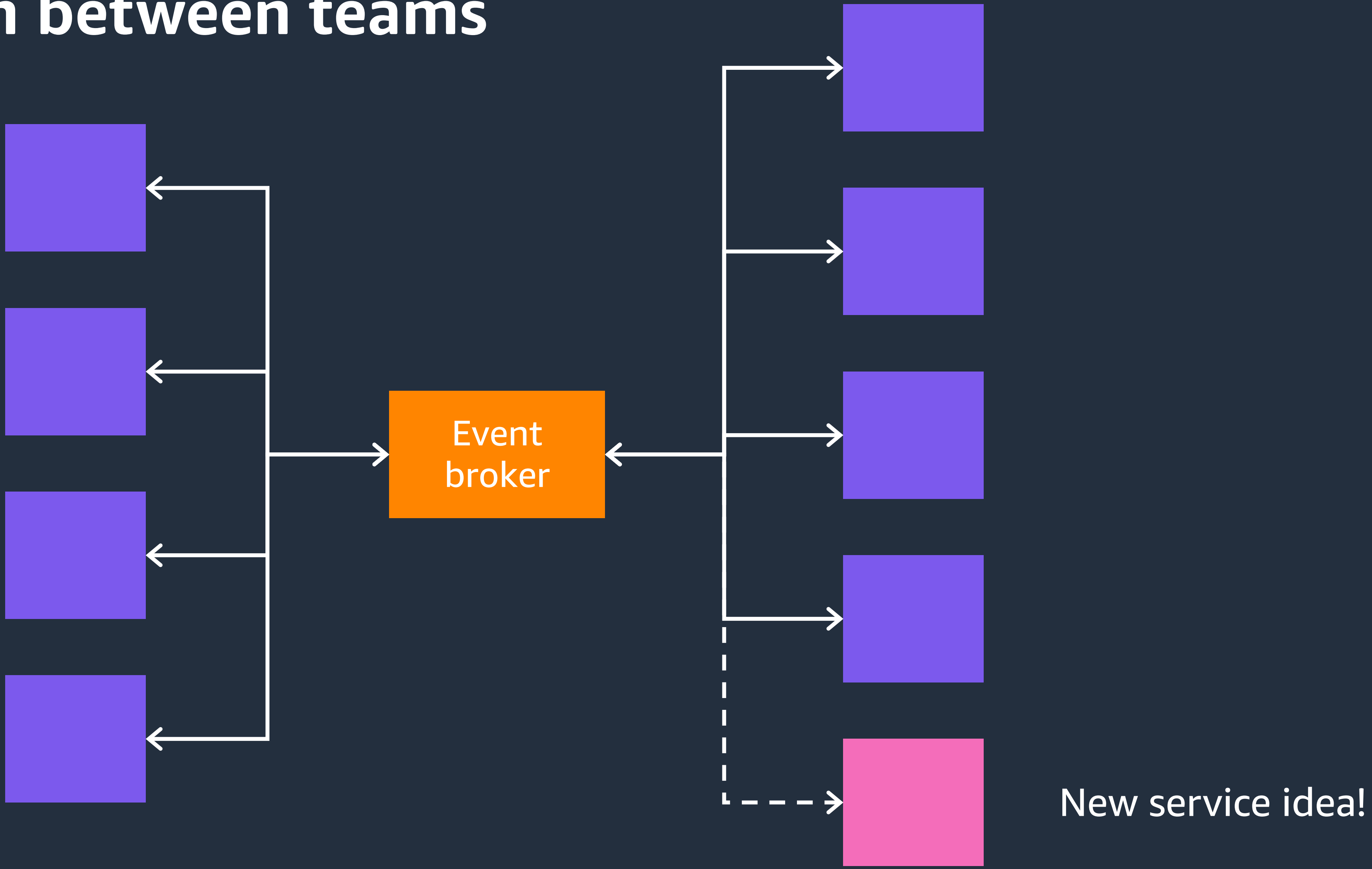
Coordinate changes with all these teams prior to deploying.



Asynchronous events reduce the need for tight coordination between teams



Asynchronous events reduce the need for tight coordination between teams



Serverless, event-driven architectures enable you to:

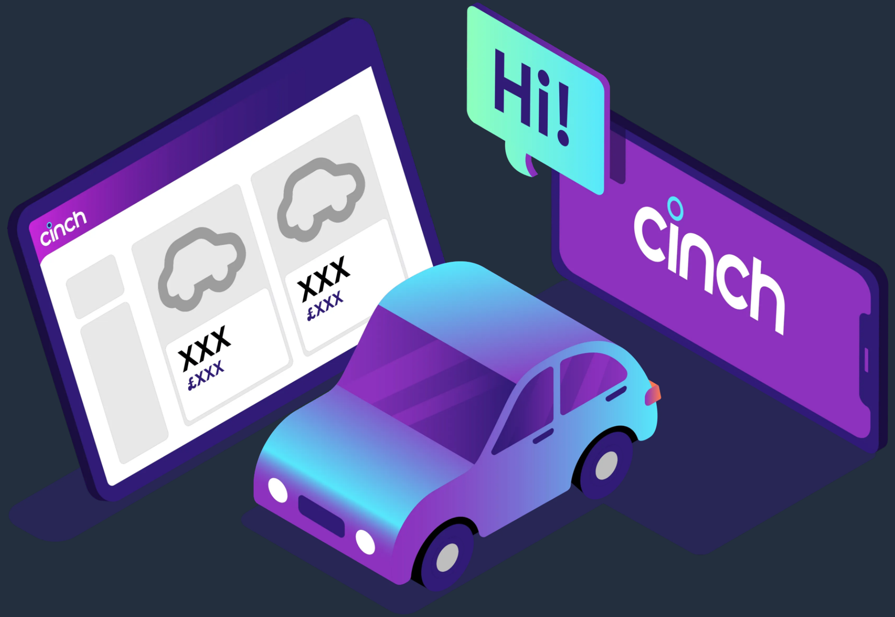
Decouple teams

Experiment constantly

Build faster

cinch: Cars without the faff

- Launched Oct. 2020
- Fully digital used car ecommerce site
- Offers free home delivery, easy payment and financing, and guaranteed part-exchange



cinch launched a new business model and event-driven platform in 6 months:

- **Scalability**: Requests exceeded 1M/minute at peak load, and request latency actually decreased as load increased.
- **Cost**: Serverless services reduced costs by 30%.
- **Agility**: A single squad can own the entire stack, enabling autonomous and cross-functional teams.
- **Growth**: Achieved 10x conversion rate in just 12 months.

👋 I’m **Toli.**

Engineering Practice Lead at cinch

½ Geordie 🇬🇧, ½ Greek 🇬🇷

λ + 🏀 + 🧘

10+ years building software 💻

@apostolis09

2019

Everyone at cinch
in a single room

2019

Everyone at cinch in a single room

2019

2020

April → Sept

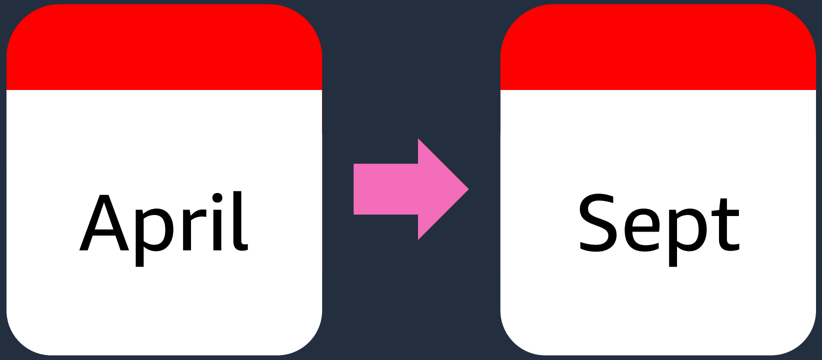
Everyone at cinch in a single room

Six months to deliver a platform

2019

Everyone at cinch in a single room

2020



Six months to deliver a platform

2022

Evolving with existing architecture

How do we disrupt an industry moving at a different pace?

How do we disrupt an industry moving at a different pace?

How to build and maintain momentum?

How do we disrupt an industry moving at a different pace?

How to build and maintain momentum?

How to avoid building tech we don’t need?

We chose:

✅ AWS

✅ Serverless

✅ Event Driven Architecture

Why serverless?

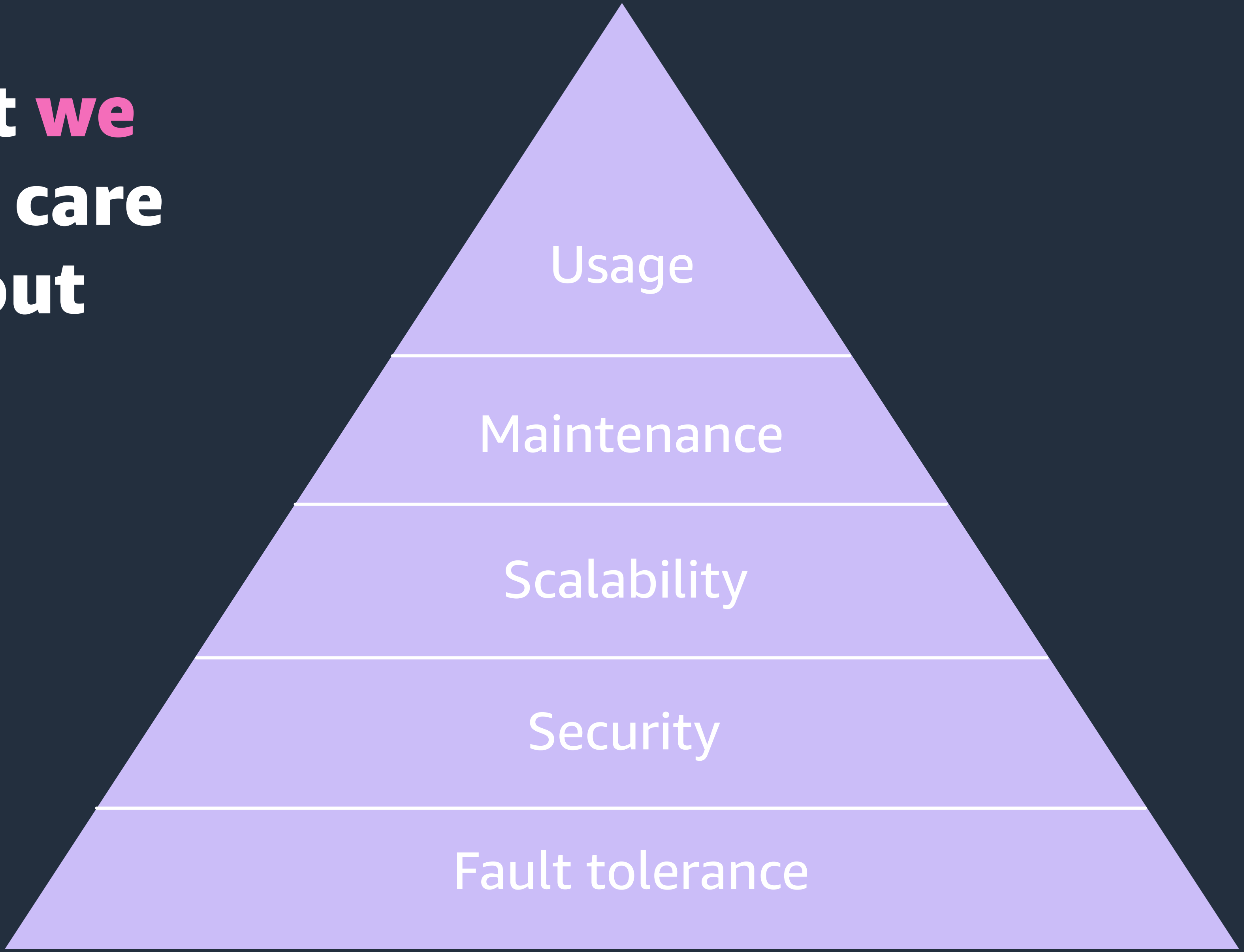
kubernetes

docker

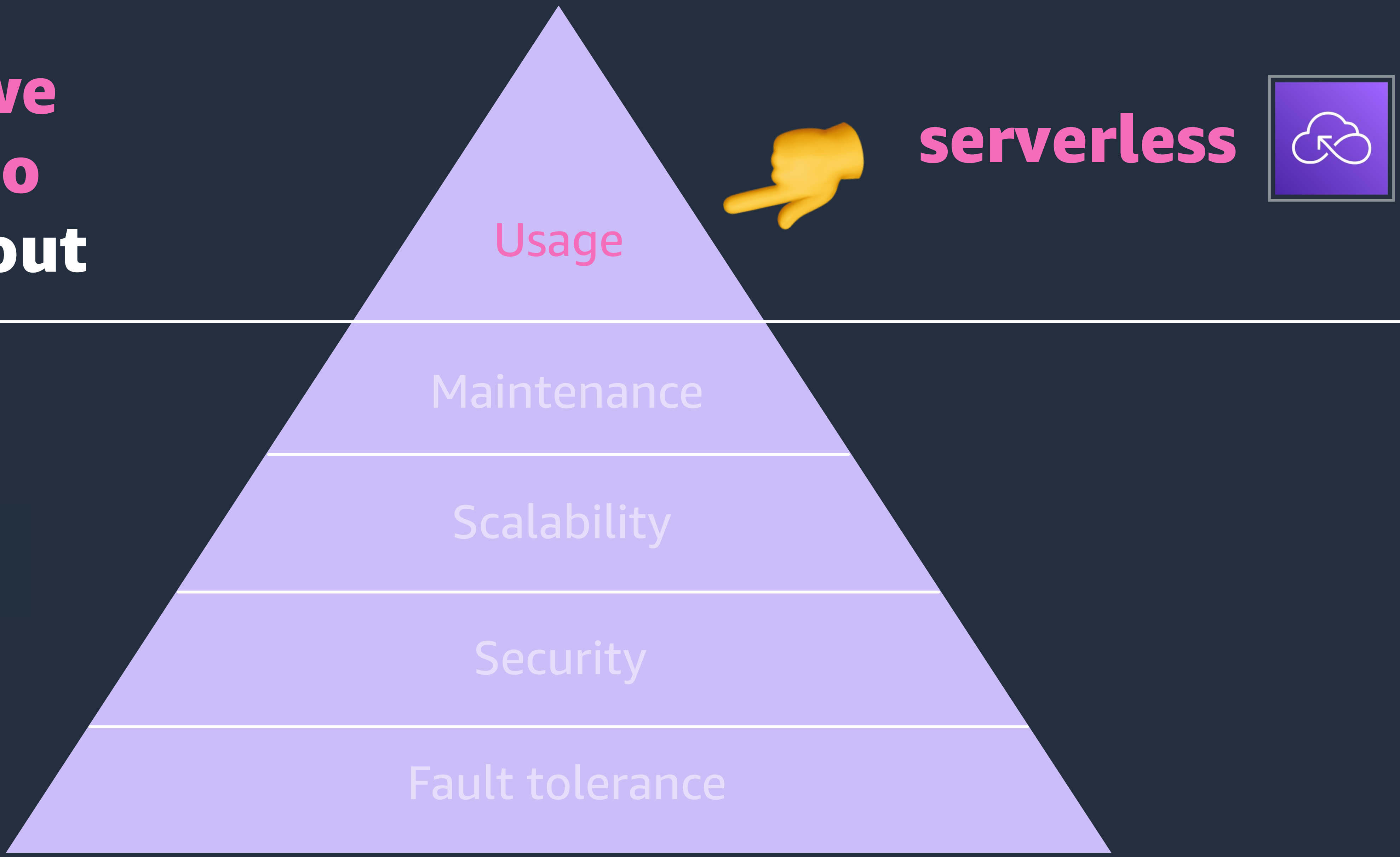
~~kubernetes~~

~~docker~~

What we could care about



What we want to care about



aws

Why event driven?

APIs	Events
✅ Performance SLA	❌ Performance SLA
✅ Interface SLA (REST API)	✅ Interface SLA (EventBridge event)

1. Systems, teams, tech stack
2. What patterns emerged?
3. How did we evolve our systems?

1. Systems, teams, tech stack

2. What patterns emerged?

3. How did we evolve our systems?

Search

Finance

Order

Delivery

Post Order

Inventory

Search

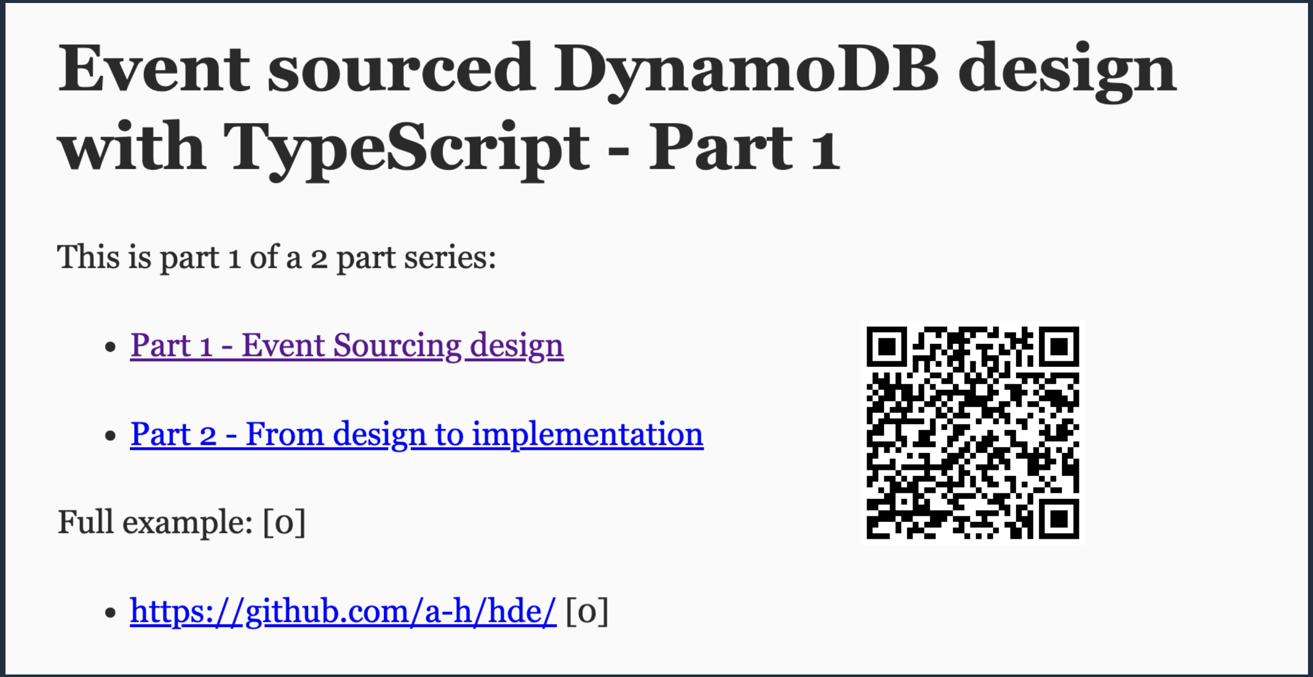
Finance

Order

Delivery

Post Order

Inventory



Event sourced DynamoDB design with TypeScript - Part 1

This is part 1 of a 2 part series:

- Part 1 - Event Sourcing design
- Part 2 - From design to implementation

Full example: [0]

- https://github.com/a-h/hde/ [0]

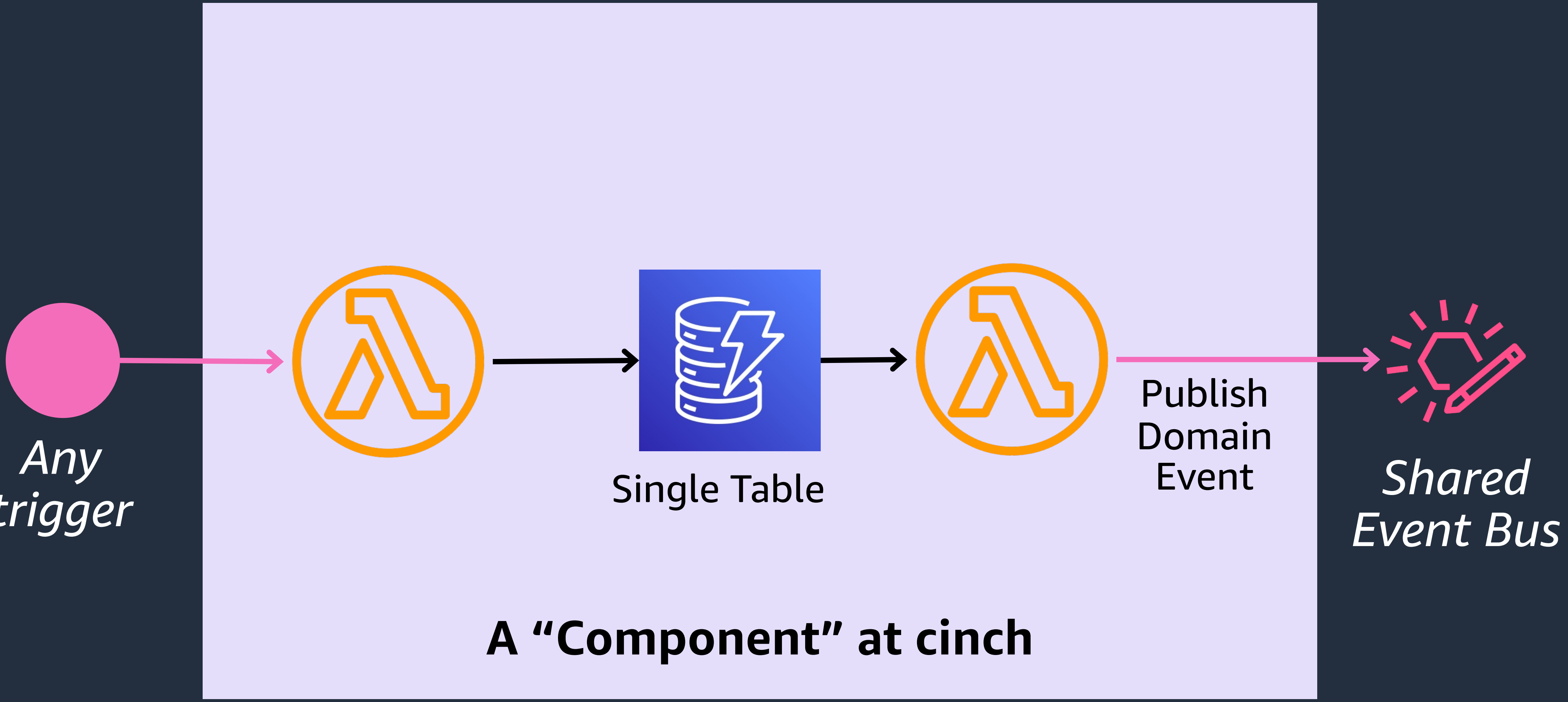
+ cinch + 2019 = 💜

🪦 ✉️ 🇬🇧

Buffering data

FIFO – exactly once

What does a team own?



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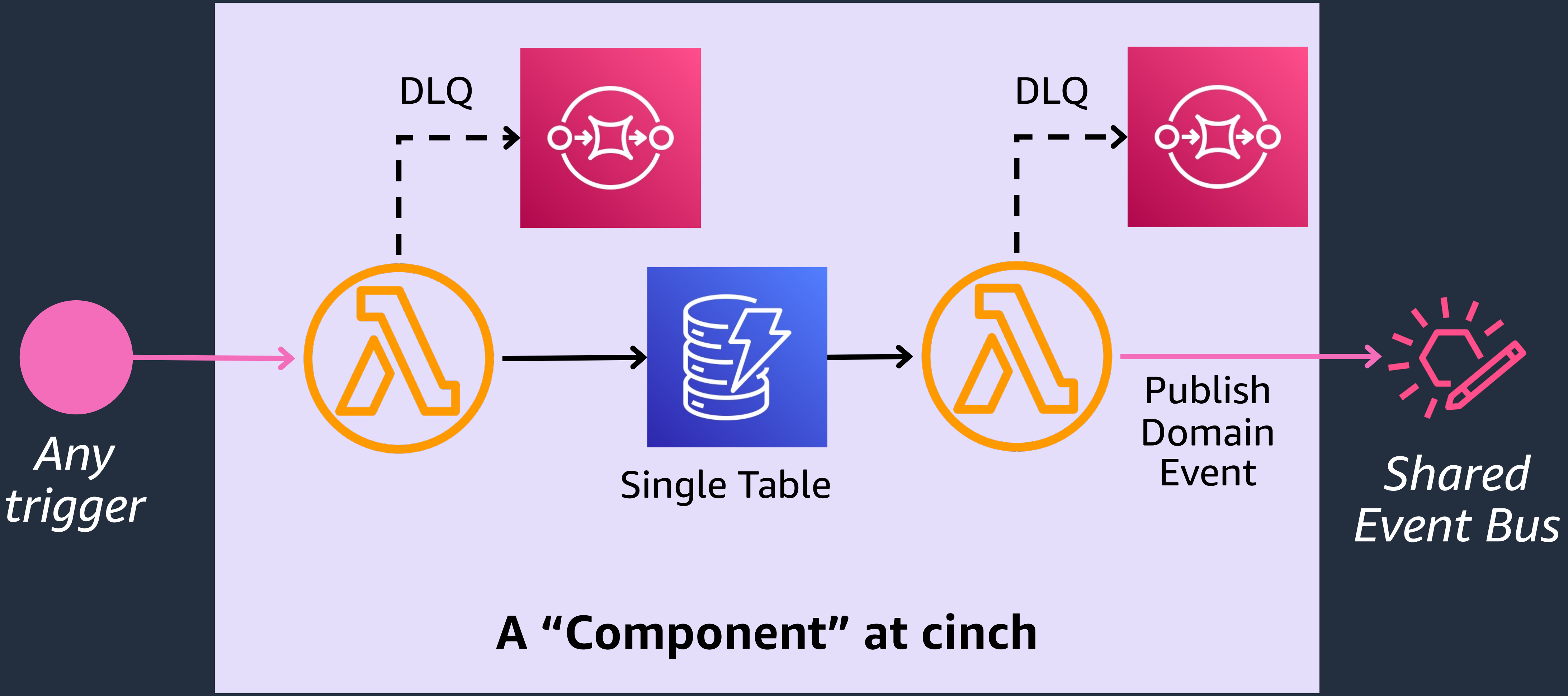
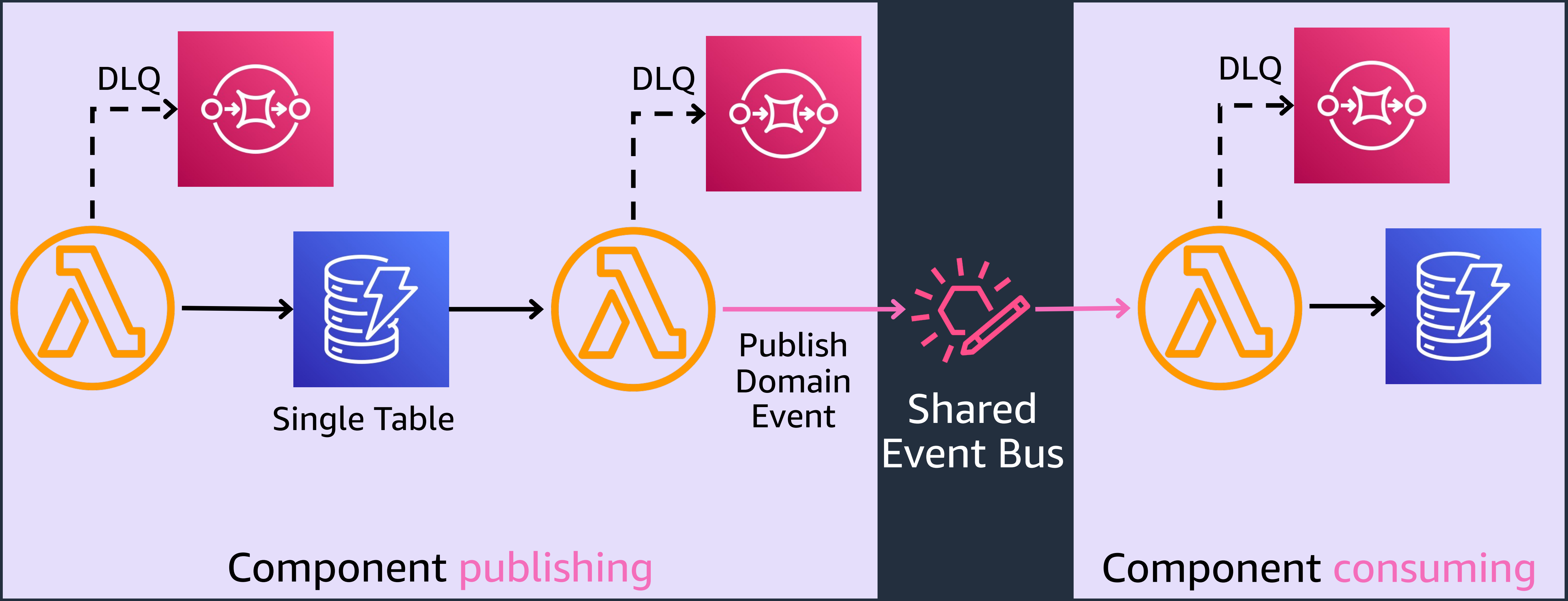
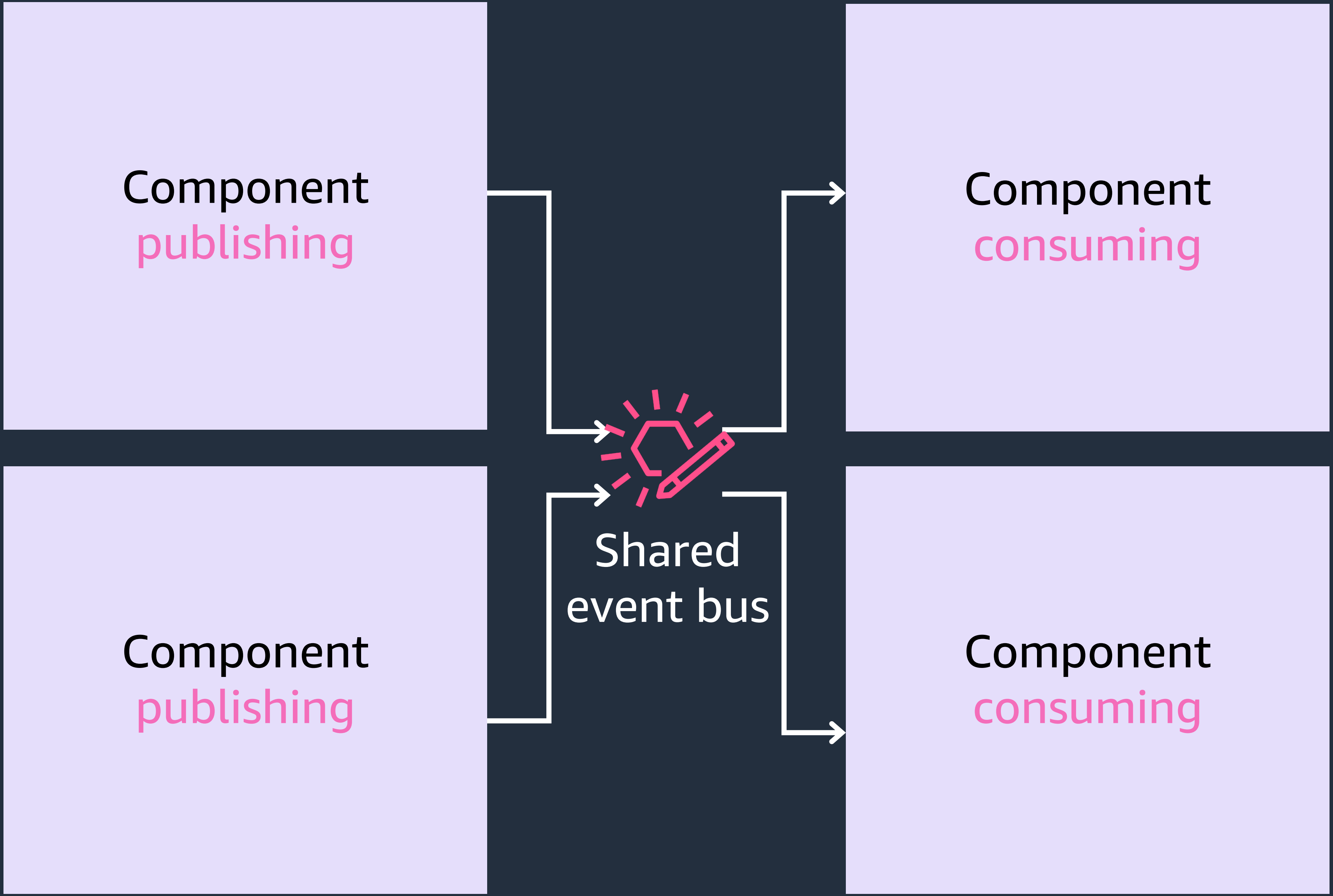
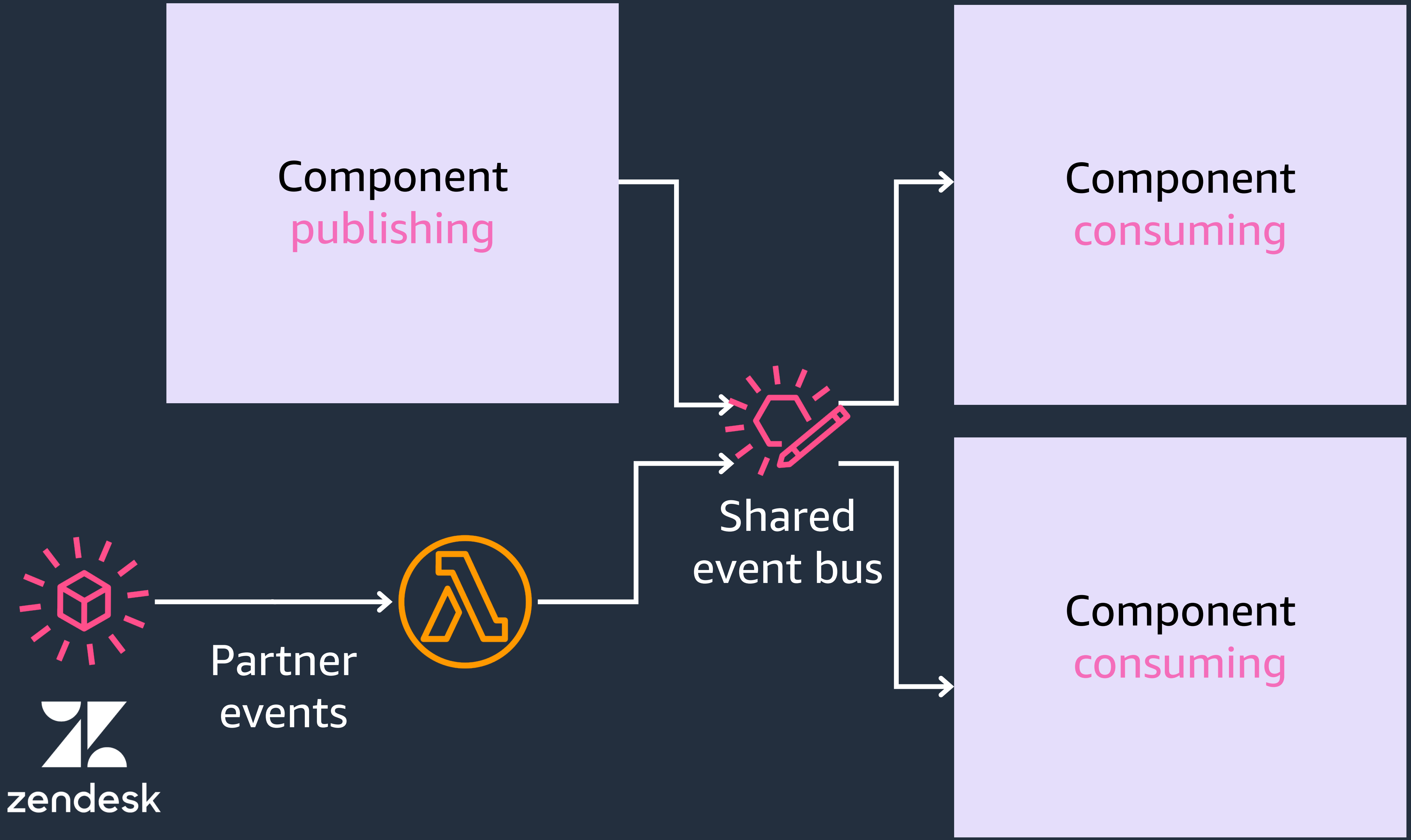



DLQ
DLQ
DLQ
Single Table
Publish Domain Event
Shared Event Bus
Component publishing
Component consuming


Component
publishing
Component
publishing
Shared
event bus
Component
consuming
Component
consuming


Component
publishing
Component
consuming
Shared
event bus
Component
consuming
zendesk
Partner
events

1. Systems, teams, tech stack
2. What patterns emerged?
3. How did we evolve our systems?

Search

Finance

Order

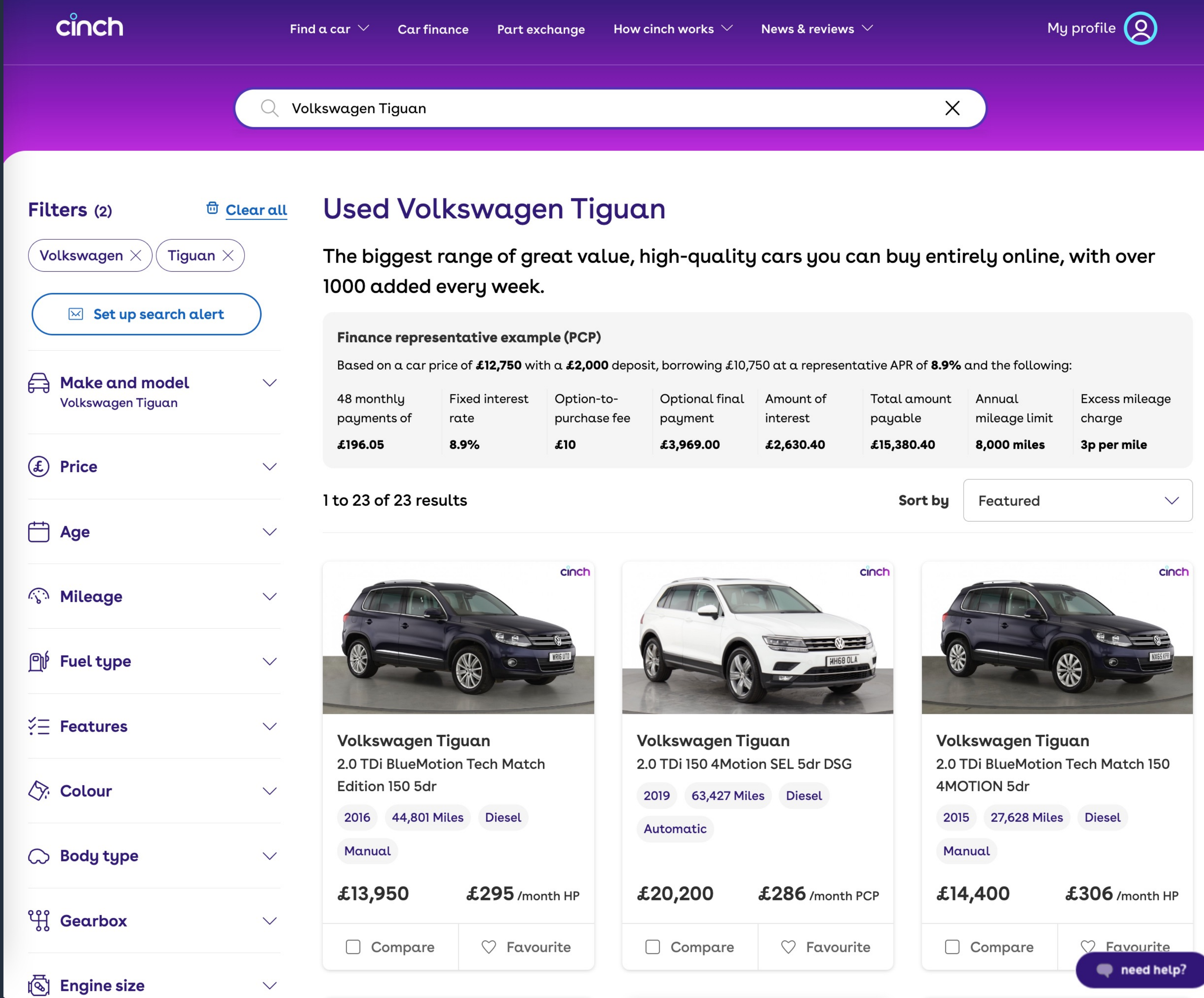
Delivery

In Life

Inventory

Search & filter for cars

Search



cinch Find a car Car finance Part exchange How cinch works News & reviews My profile

Volkswagen Tiguan

Filters (2) Clear all

Volkswagen × Tiguan ×

Set up search alert

- Make and model: Volkswagen Tiguan
- Price
- Age
- Mileage
- Fuel type
- Features
- Colour
- Body type
- Gearbox
- Engine size

Used Volkswagen Tiguan

The biggest range of great value, high-quality cars you can buy entirely online, with over 1000 added every week.

Finance representative example (PCP)

Based on a car price of **£12,750** with a **£2,000** deposit, borrowing £10,750 at a representative APR of **8.9%** and the following:

48 monthly payments of	Fixed interest rate	Option-to-purchase fee	Optional final payment	Amount of interest	Total amount payable	Annual mileage limit	Excess mileage charge
£196.05	**8.9%**	**£10**	**£3,969.00**	**£2,630.40**	**£15,380.40**	**8,000 miles**	**3p per mile**

1 to 23 of 23 results

Sort by: Featured

Volkswagen Tiguan	**Volkswagen Tiguan**	**Volkswagen Tiguan**
2.0 TDi BlueMotion Tech Match Edition 150 5dr	2.0 TDi 150 4Motion SEL 5dr DSG	2.0 TDi BlueMotion Tech Match 150 4MOTION 5dr
2016 · 44,801 Miles · Diesel · Manual	2019 · 63,427 Miles · Diesel · Automatic	2015 · 27,628 Miles · Diesel · Manual
£13,950 · £295 /month HP	£20,200 · £286 /month PCP	£14,400 · £306 /month HP
Compare · Favourite	Compare · Favourite	Compare · Favourite

need help?

aws

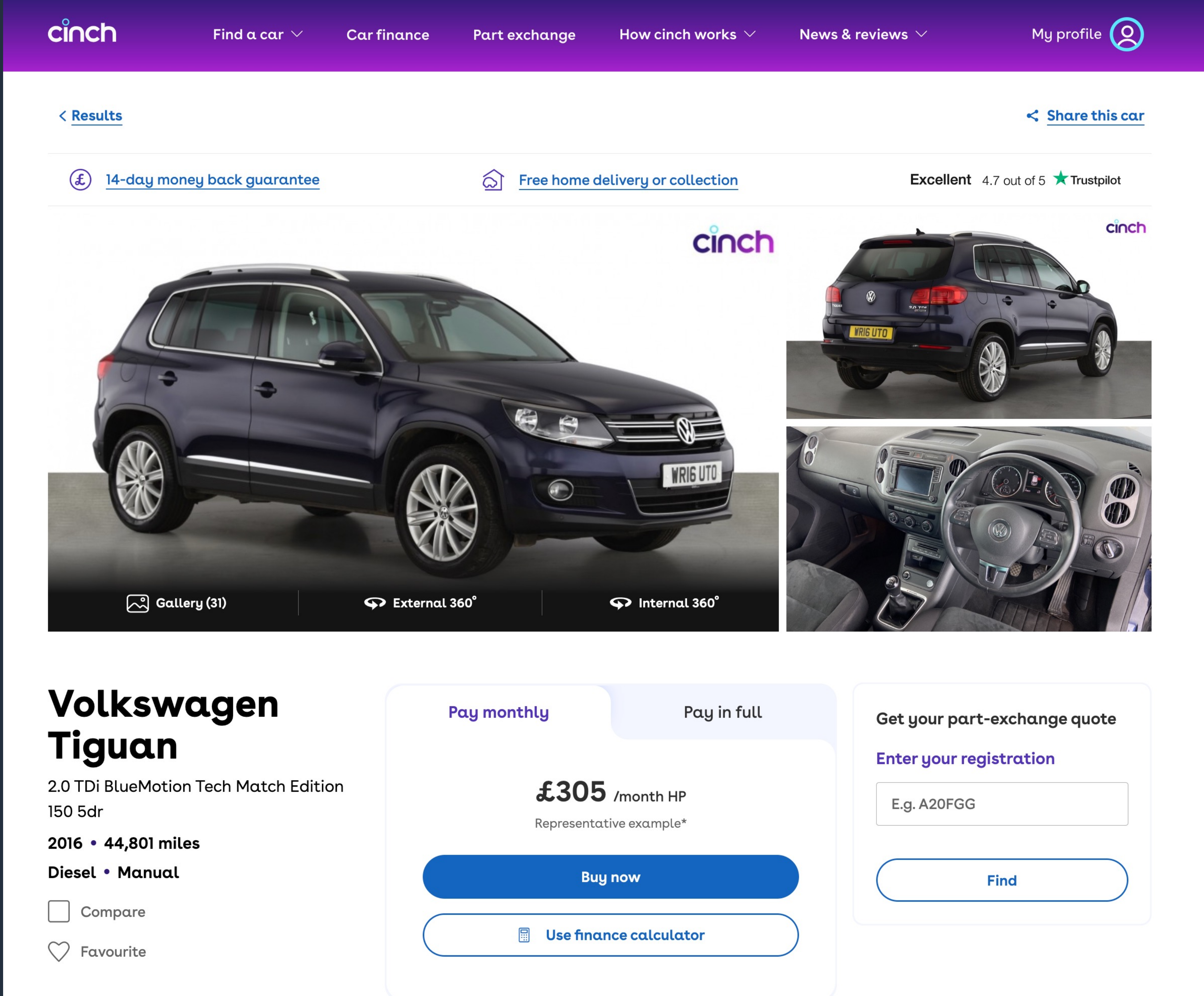
Car info & status

+

View car details

Inventory

aws



cinch Find a car Car finance Part exchange How cinch works News & reviews My profile

Results

Share this car

14-day money back guarantee

Free home delivery or collection

Excellent 4.7 out of 5 Trustpilot

Gallery (31) External 360° Internal 360°

Volkswagen Tiguan

2.0 TDi BlueMotion Tech Match Edition 150 5dr

2016 • 44,801 miles

Diesel • Manual

Compare

Favourite

Pay monthly | Pay in full

£305 /month HP

Representative example*

Buy now

Use finance calculator

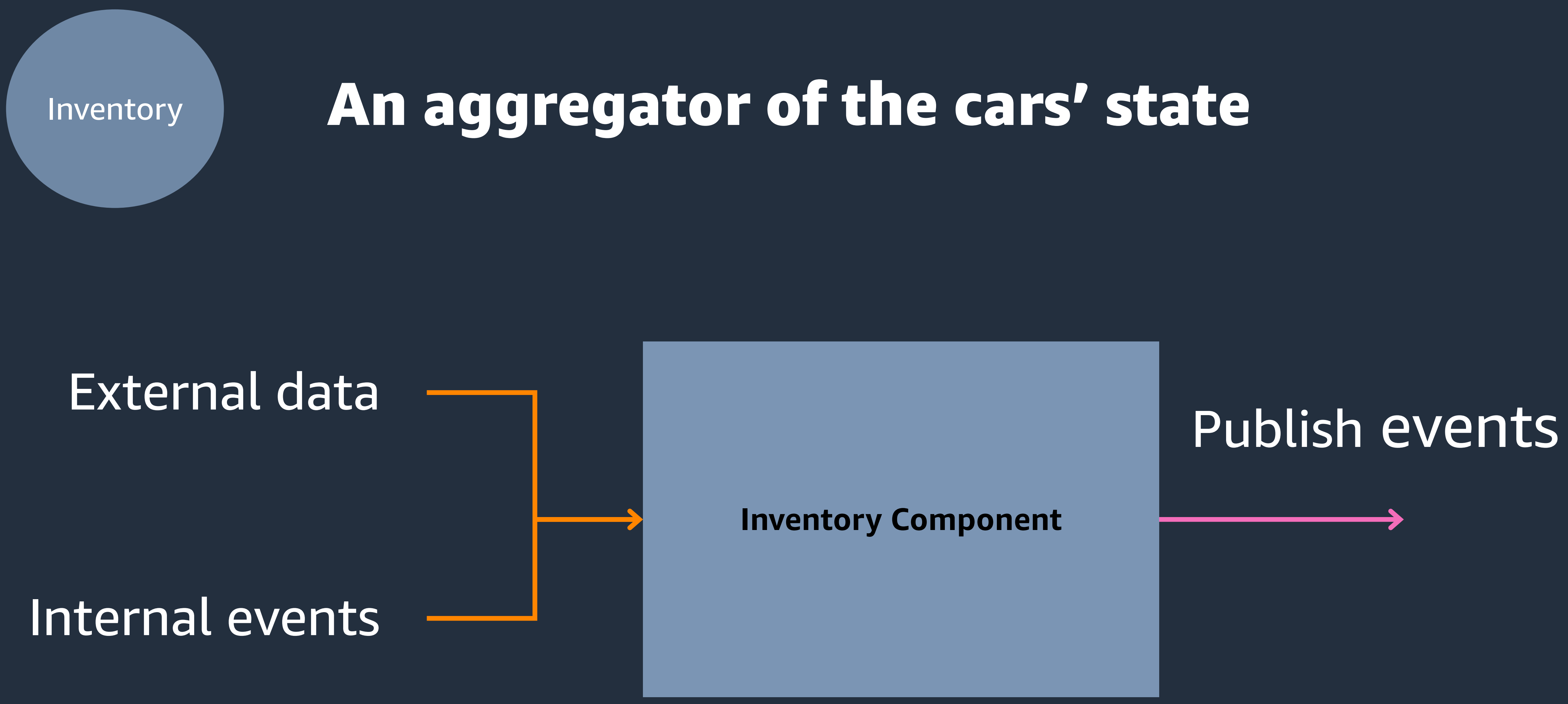
Get your part-exchange quote

Enter your registration

E.g. A20FGG

Find

An aggregator of the cars’ state



🍽️ Consumed

VehicleAcquired

VehicleSold

VehicleDelivered

Inventory

📣 Published

VehicleImported

VehiclePublished

VehicleUpdated

Consumed

VehicleAcquired

VehicleSold

VehicleDelivered

Inventory

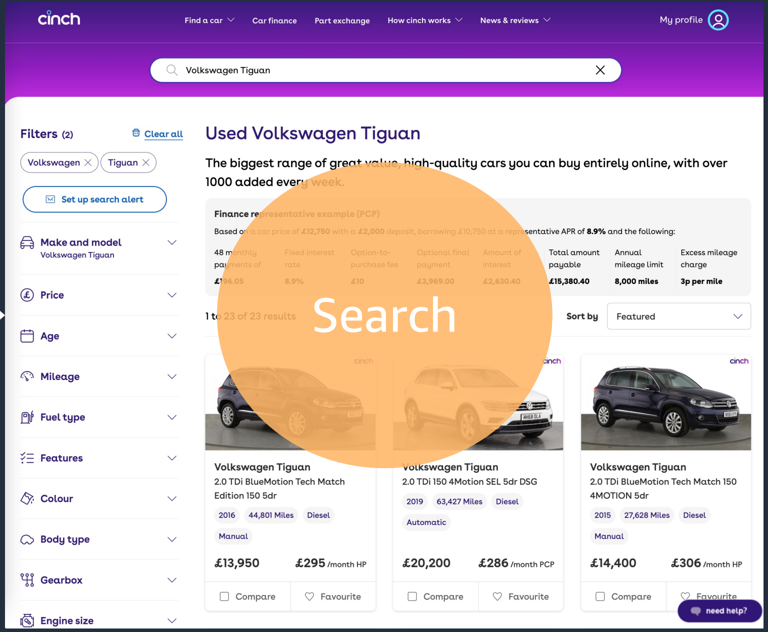
Published

VehicleImported

VehiclePublished

VehicleUpdated

Inventory Component



Volkswagen Tiguan

Filters (2) Clear all

Volkswagen Tiguan

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Make and model
Volkswagen Tiguan

Price

Age

Mileage

Fuel type

Features

Colour

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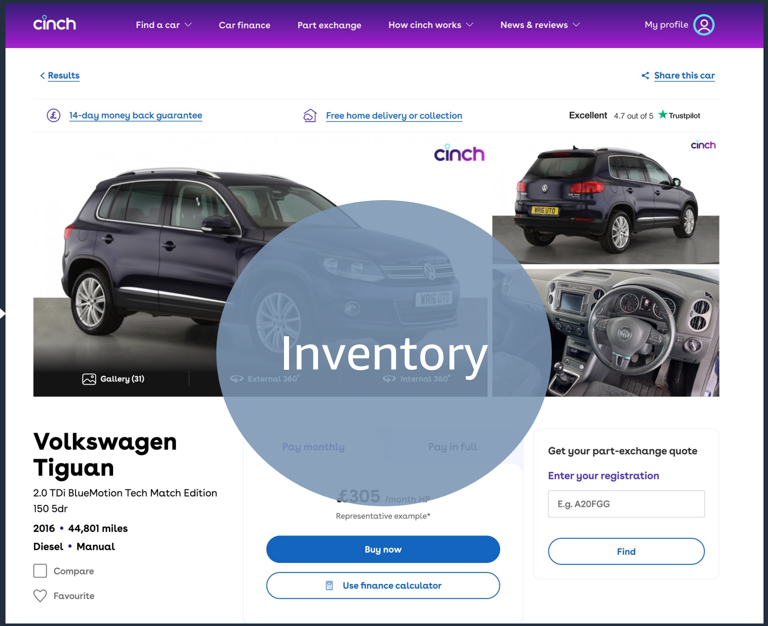
need help?



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Diesel • Manual

Compare

Favourite

Pay monthly Pay in full

£305 /month HP

Representative example*

Buy now

Use finance calculator

Get your part-exchange quote

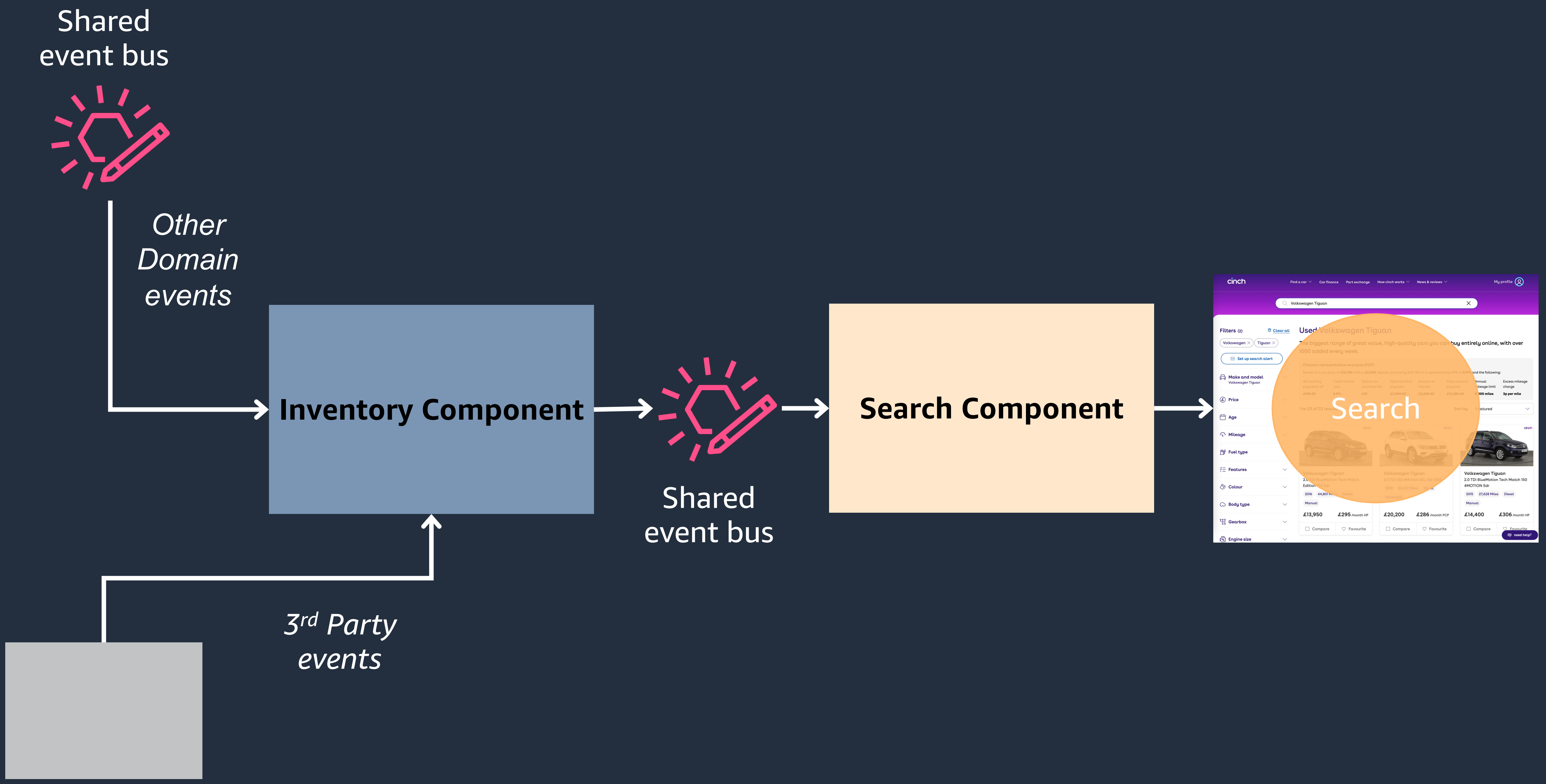
Enter your registration

E.g. A20FGG

Find

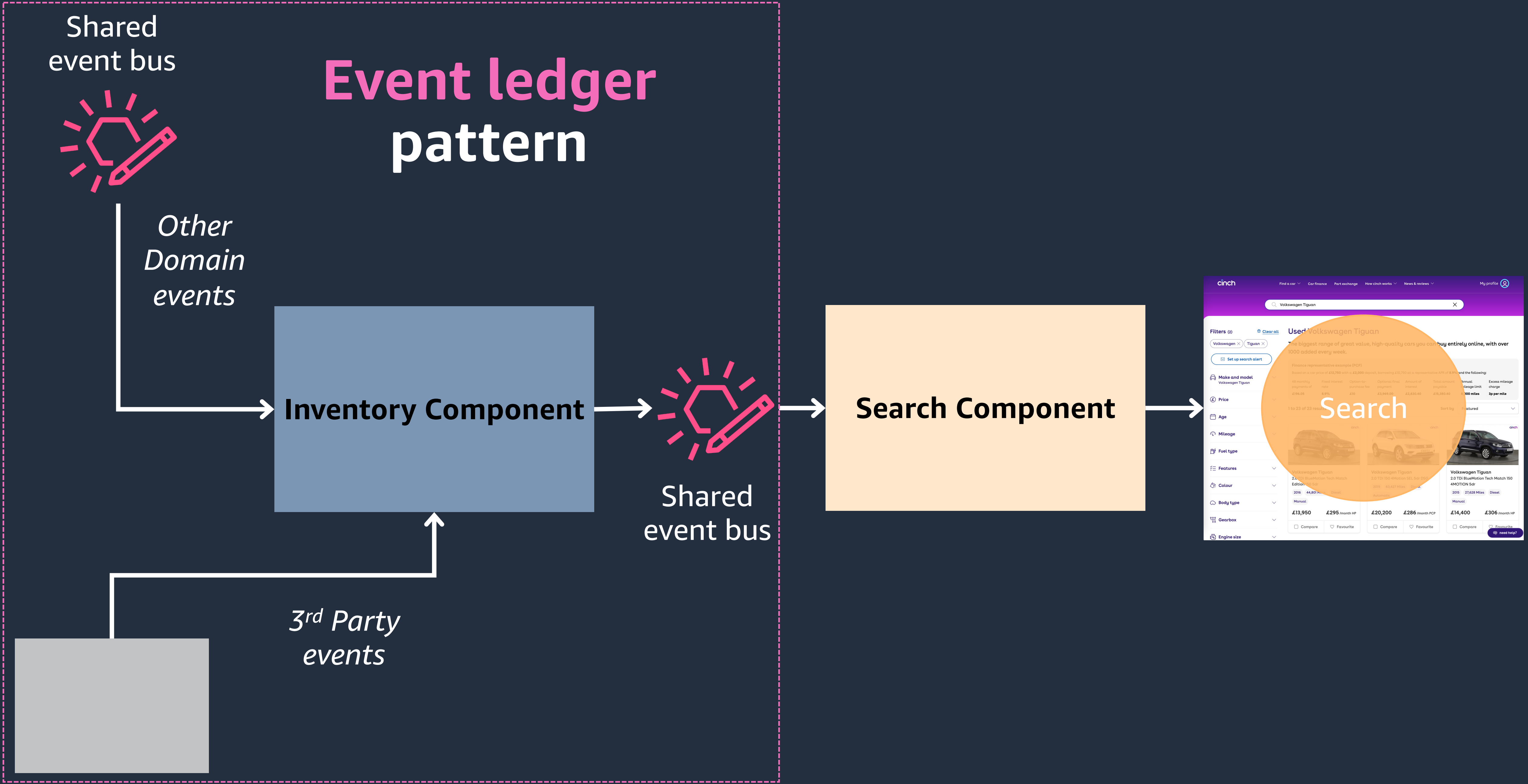
How do these two systems interact*?

*in an Event Driven way

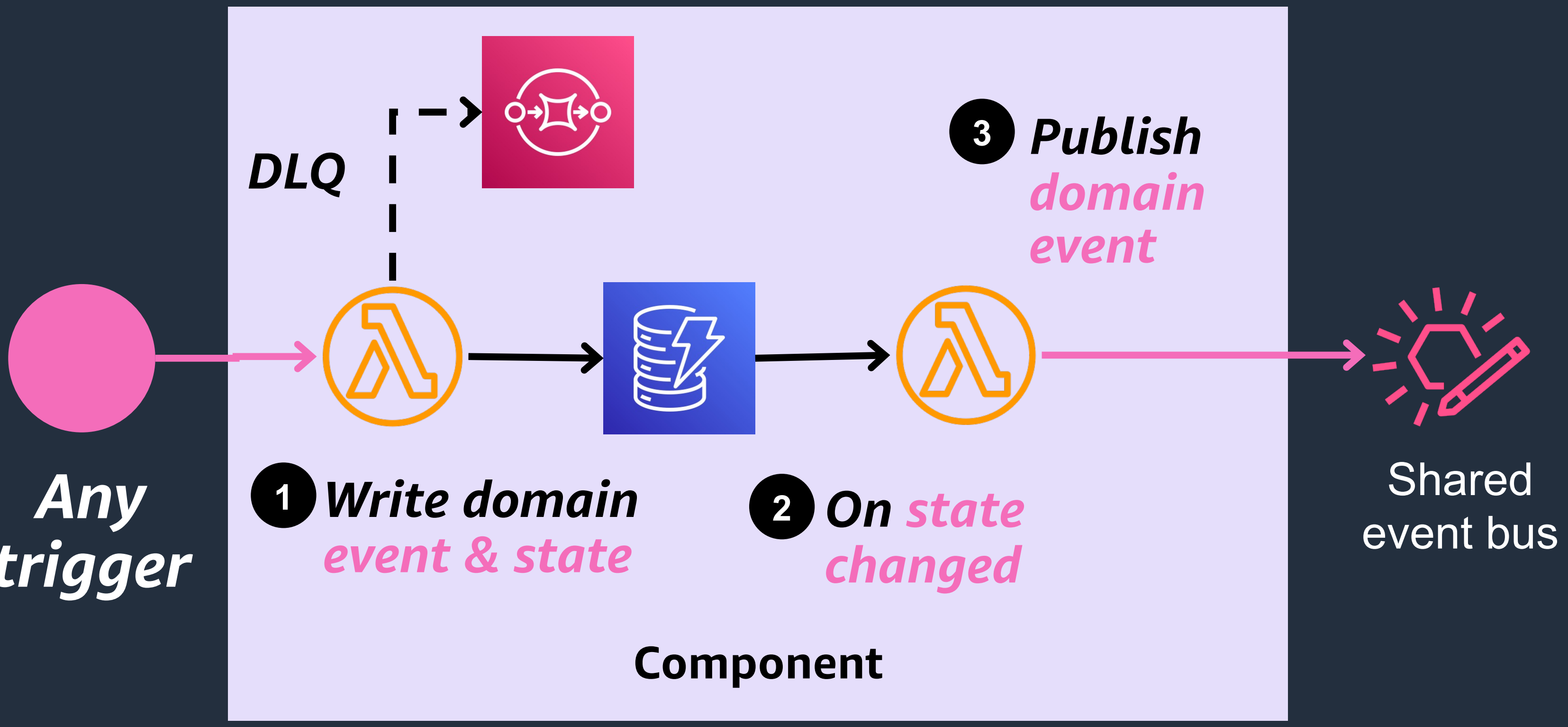

Shared event bus
Other Domain events
Inventory Component
Shared event bus
Search Component
Search
3rd Party events
cinch

aws

Event ledger pattern



Event ledger pattern



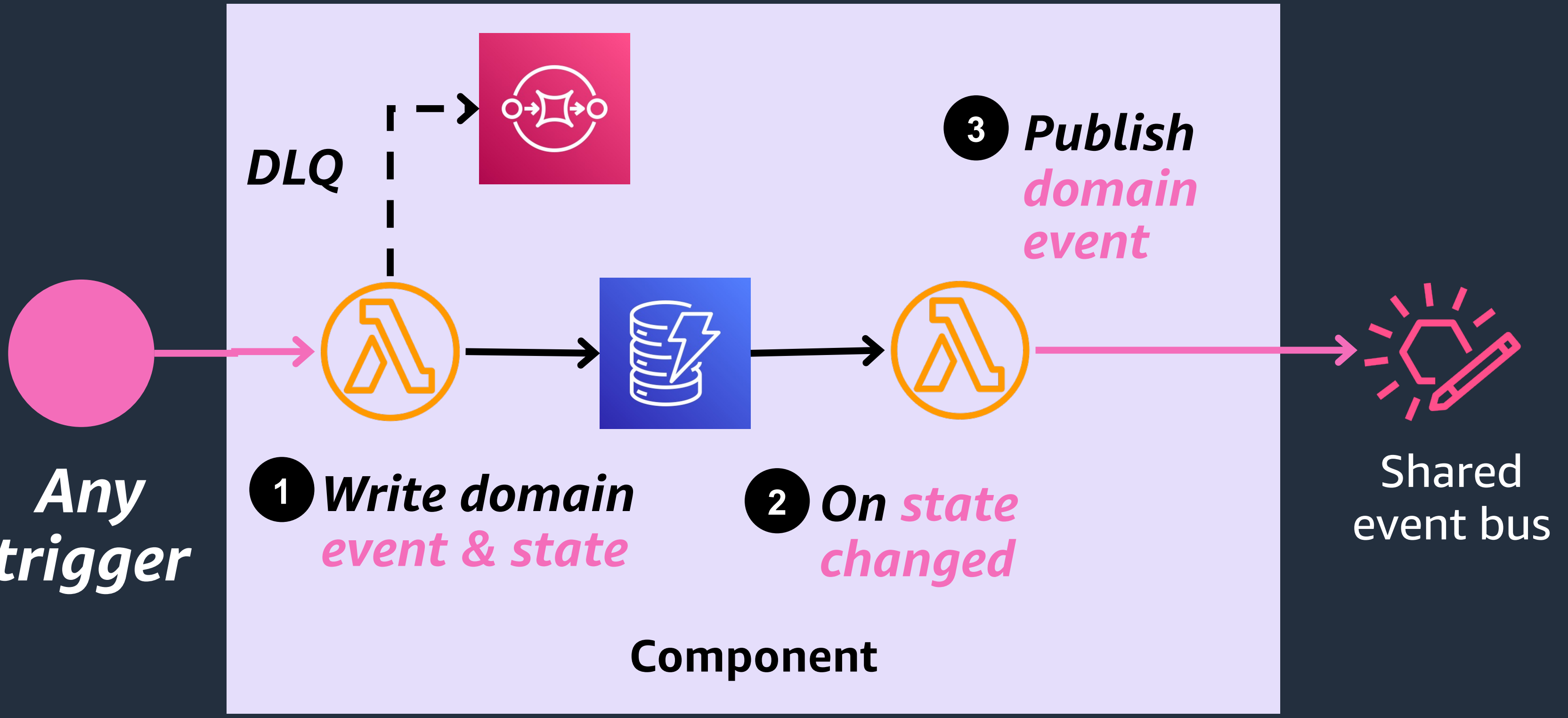
✅ Stores events & state

✅ Store & forget

✅ Outsource consistency to AWS

✅ Publish events by default

Event ledger pattern



🤔 Not CRUD, not familiar

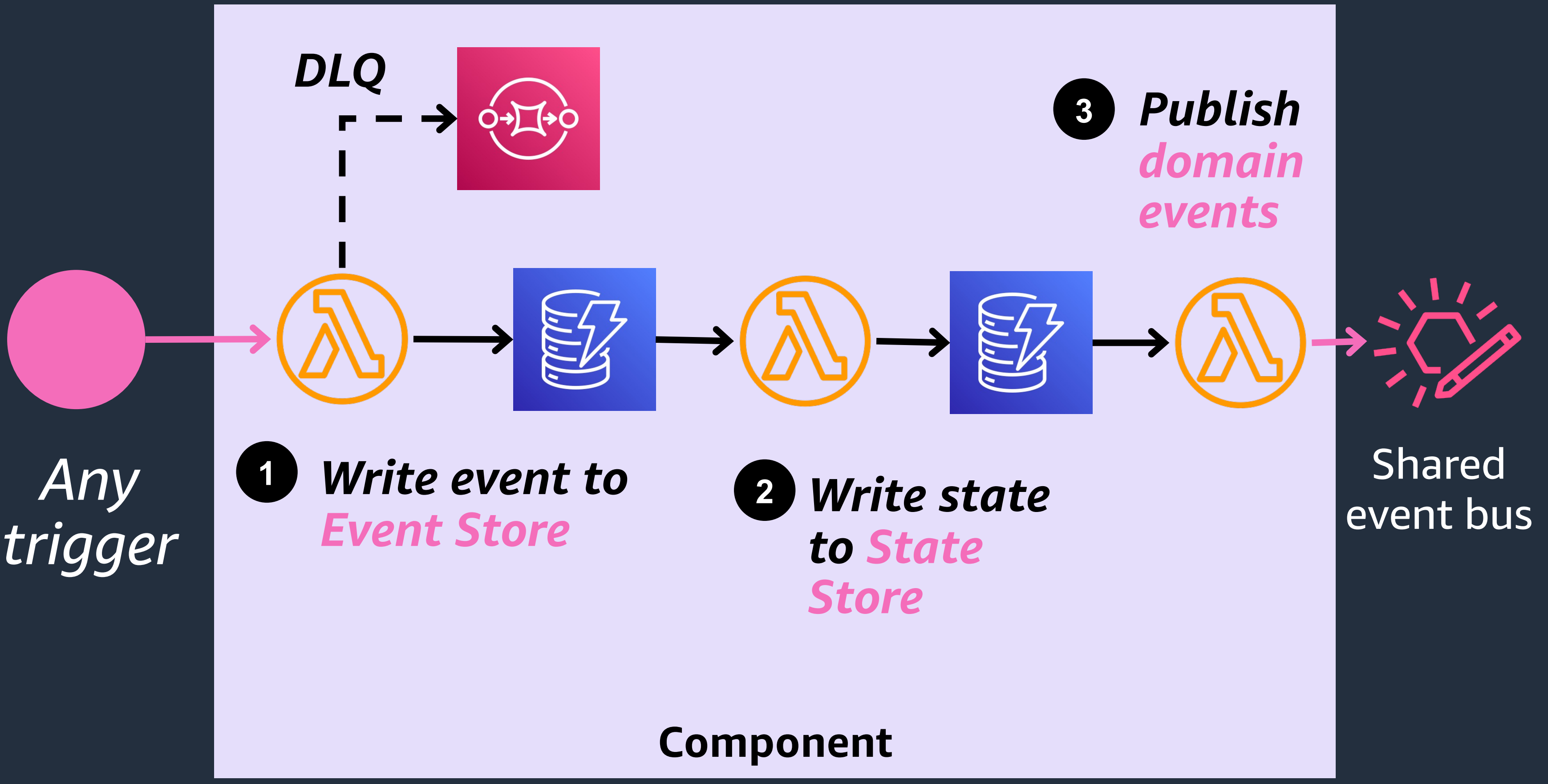
🤔 We exposed database schema

🤔 Mixed private and public events

🤔 **Mixed event & state store**

🤔 How are we solving this?

Event/State Store pattern



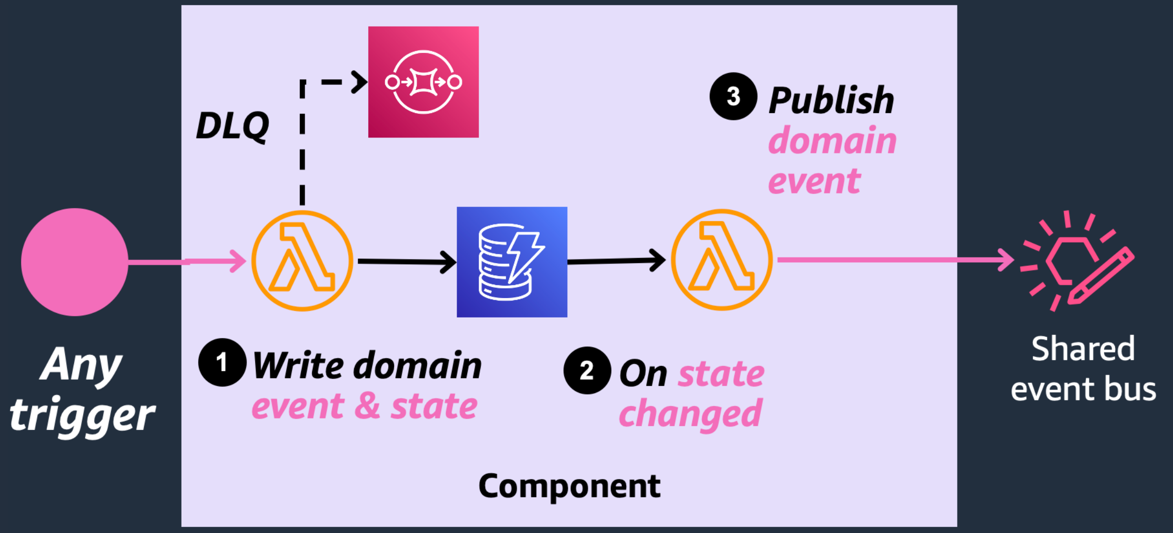
✅ Event store helps with debugging

✅ Consistent & stateless flow of data

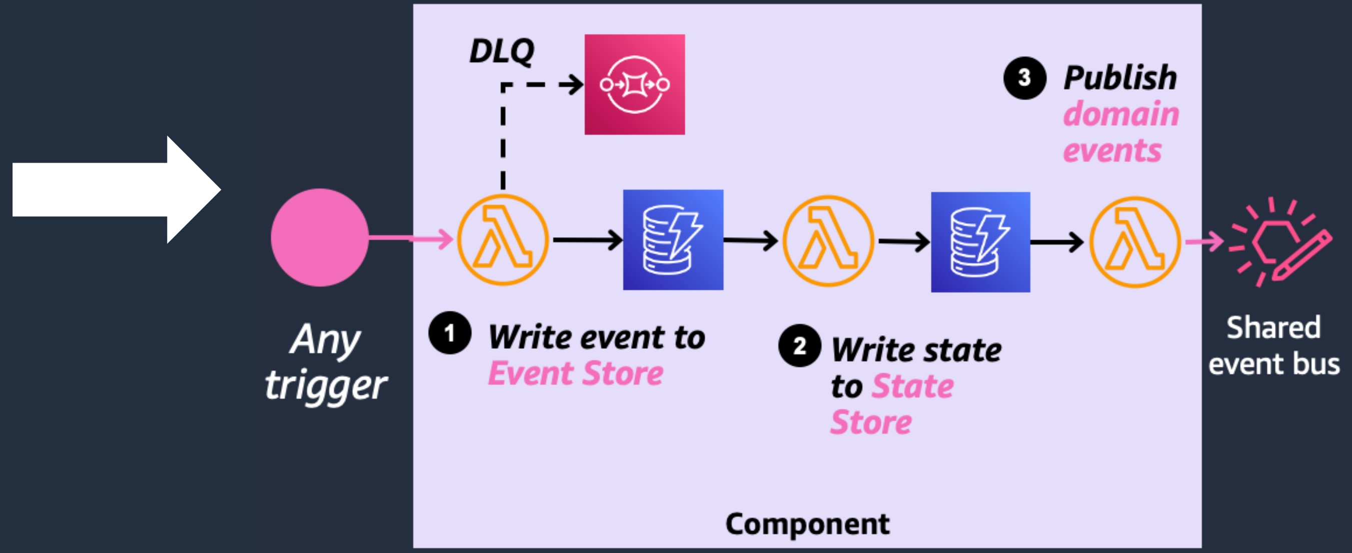
✅ State store as cache

✅ State store serves as a presentation layer

Event ledger pattern



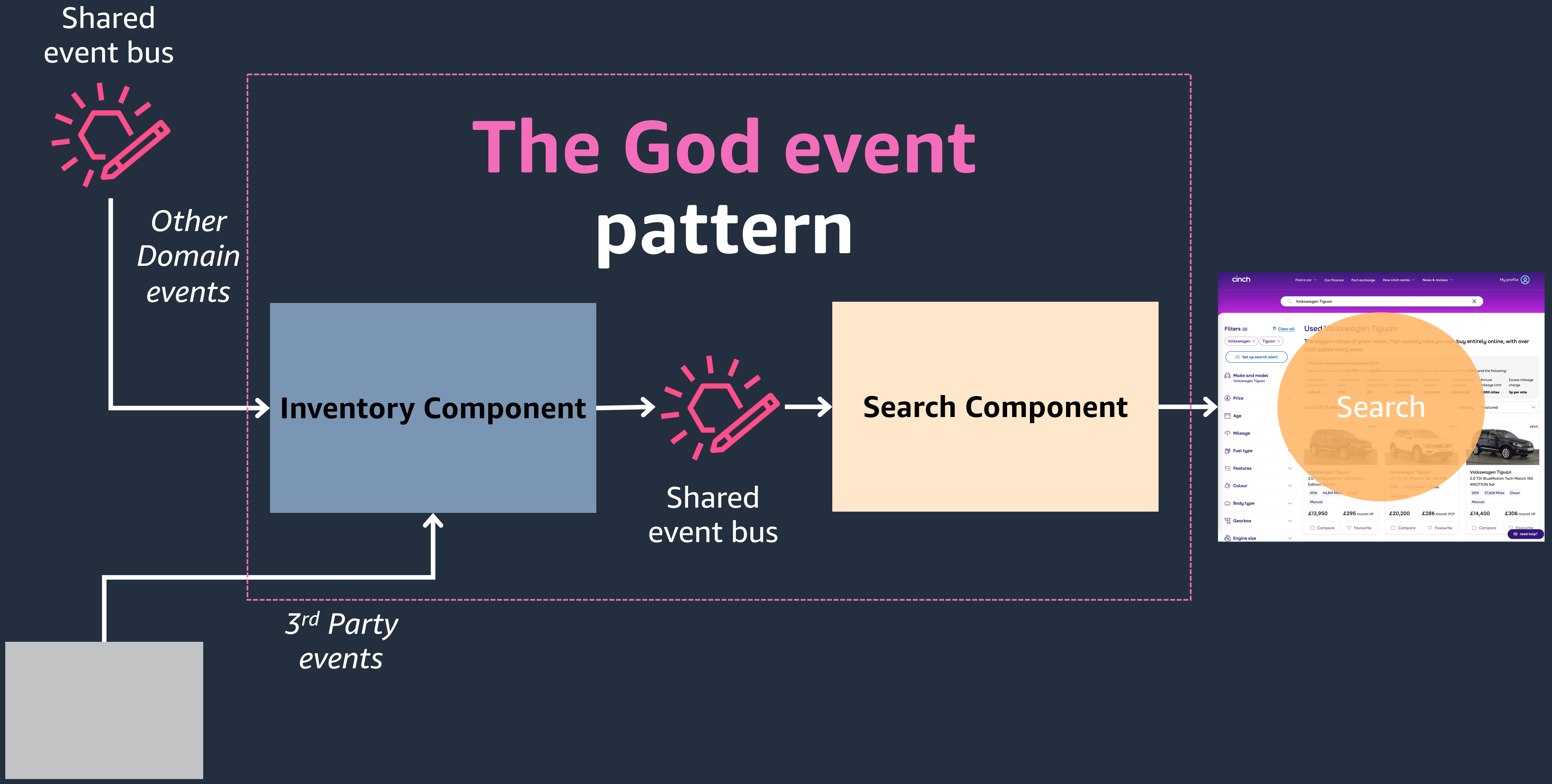
Event/State Store pattern



How to share vehicle updates*?

*In an Event Driven way

The God event pattern



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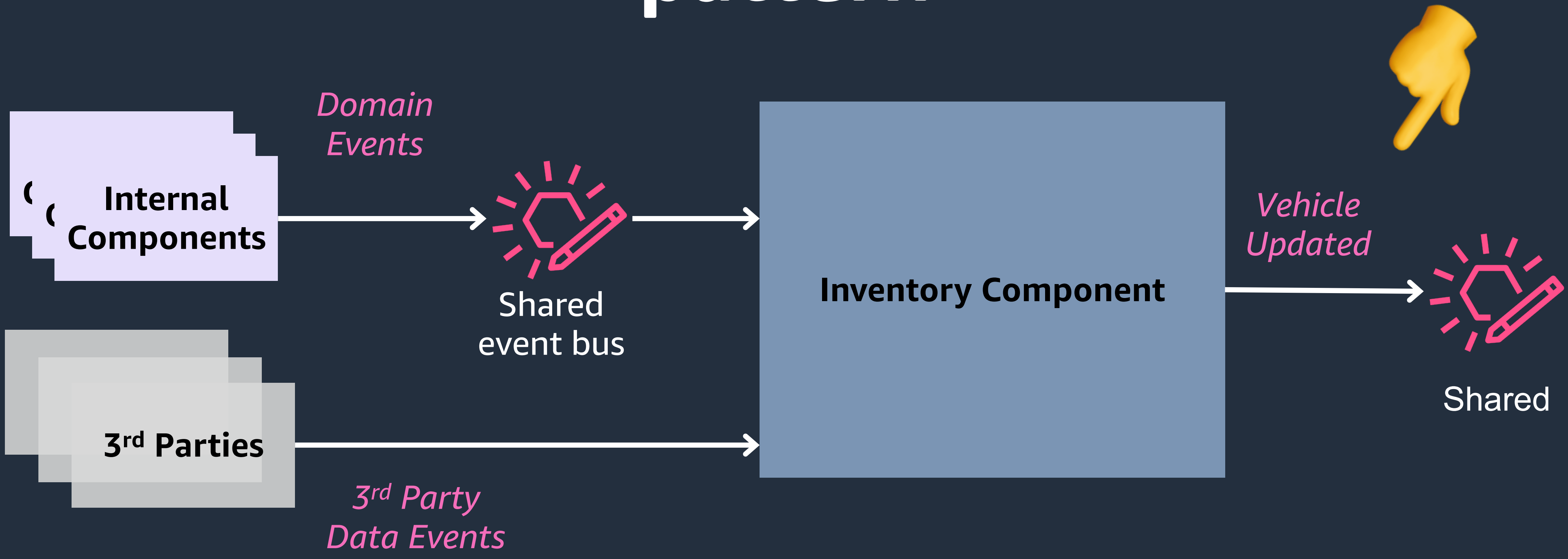


VehicleUpdated →

a “latest state” event

a general-purpose update event

has all the state about a vehicle

has 80+ fields

the contract never breaks

Event Carried State Transfer

👇

VehicleUpdated ➡

a "latest state" event

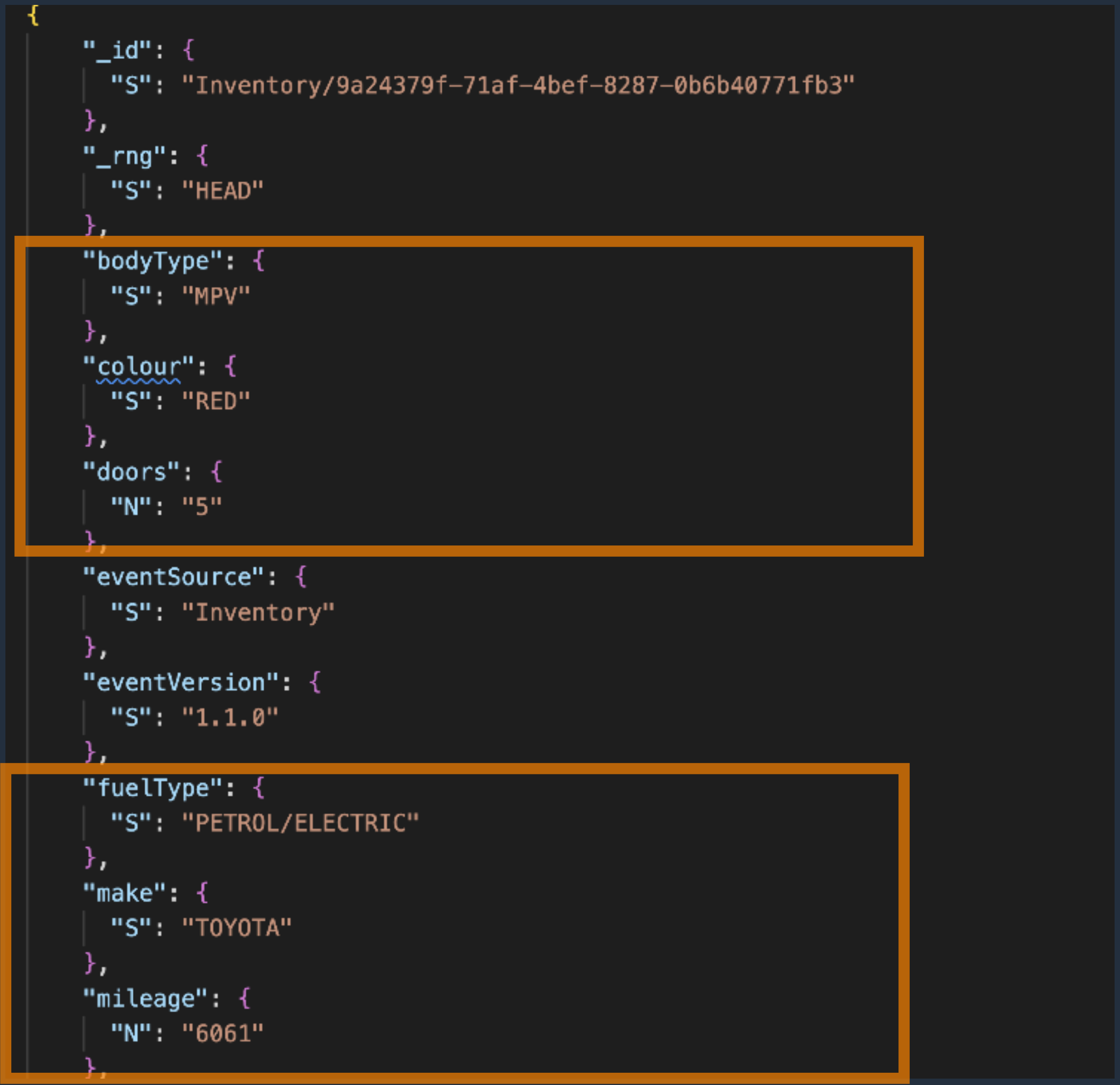
a general-purpose update event

has all the state about a vehicle

has 80+ fields

the contract never breaks

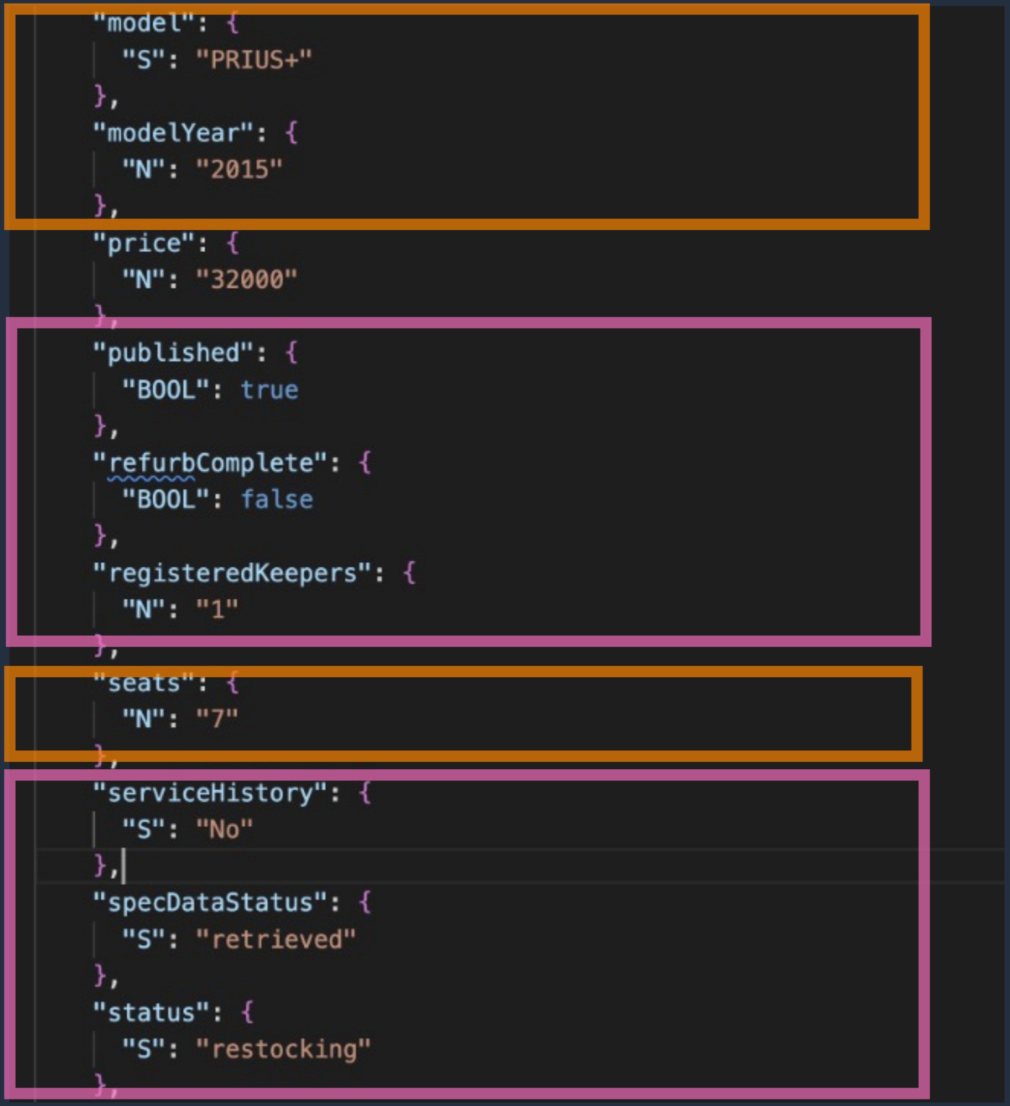
Information about the car



```
{
    "_id": {
      "S": "Inventory/9a24379f-71af-4bef-8287-0b6b40771fb3"
    },
    "_rng": {
      "S": "HEAD"
    },
    "bodyType": {
      "S": "MPV"
    },
    "colour": {
      "S": "RED"
    },
    "doors": {
      "N": "5"
    },
    "eventSource": {
      "S": "Inventory"
    },
    "eventVersion": {
      "S": "1.1.0"
    },
    "fuelType": {
      "S": "PETROL/ELECTRIC"
    },
    "make": {
      "S": "TOYOTA"
    },
    "mileage": {
      "N": "6061"
    },
```

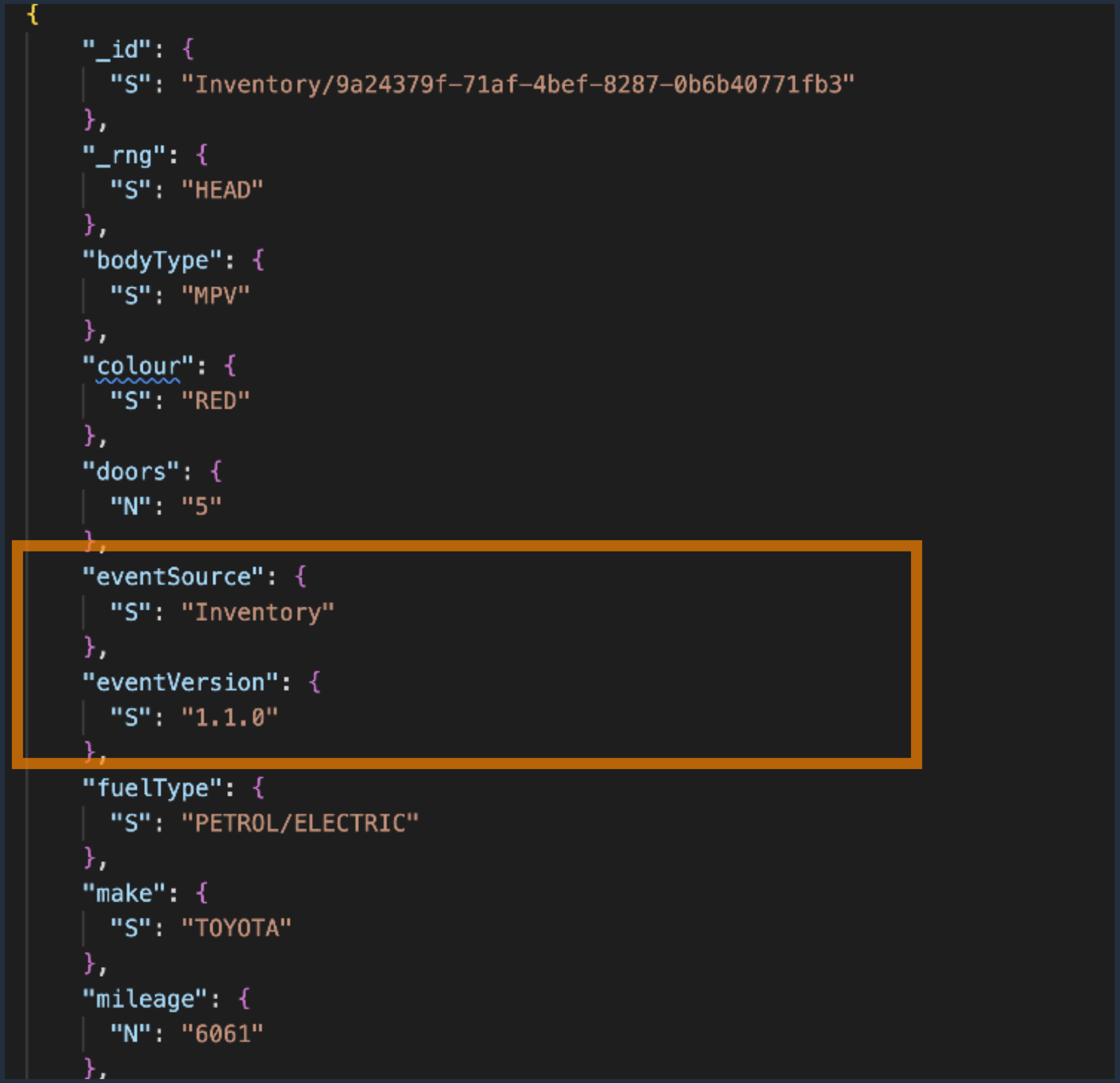
Information about the car status

Information about the car



```
"model": {
  "S": "PRIUS+"
},
"modelYear": {
  "N": "2015"
},
"price": {
  "N": "32000"
},
"published": {
  "BOOL": true
},
"refurbComplete": {
  "BOOL": false
},
"registeredKeepers": {
  "N": "1"
},
"seats": {
  "N": "7"
},
"serviceHistory": {
  "S": "No"
},
"specDataStatus": {
  "S": "retrieved"
},
"status": {
  "S": "restocking"
},
```

Metadata about the event



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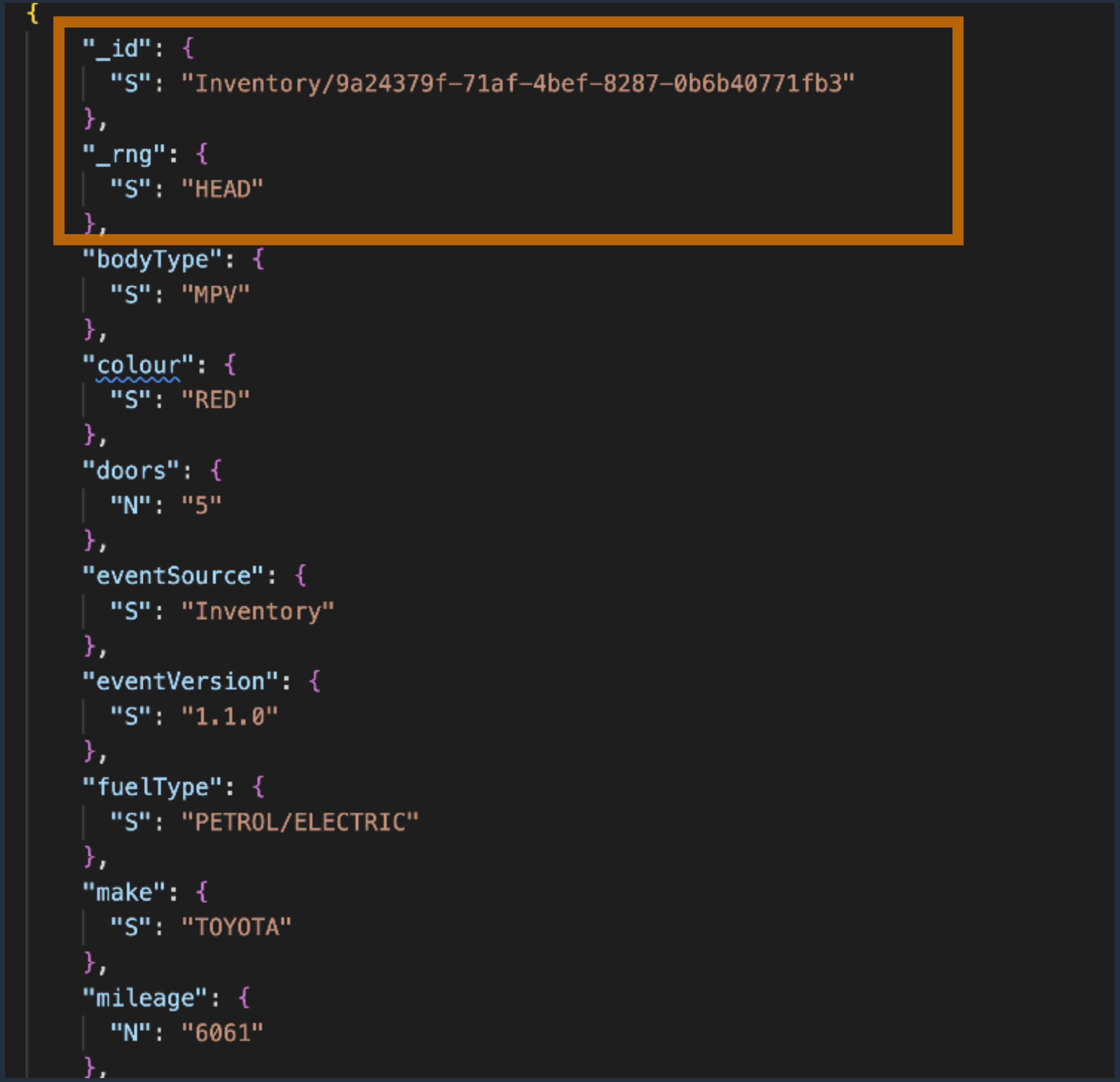
```

Some implementation detail



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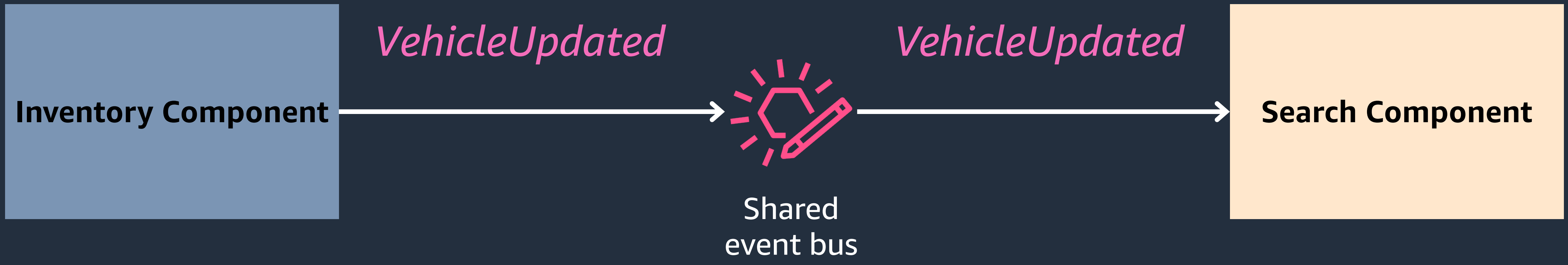
The God event pattern



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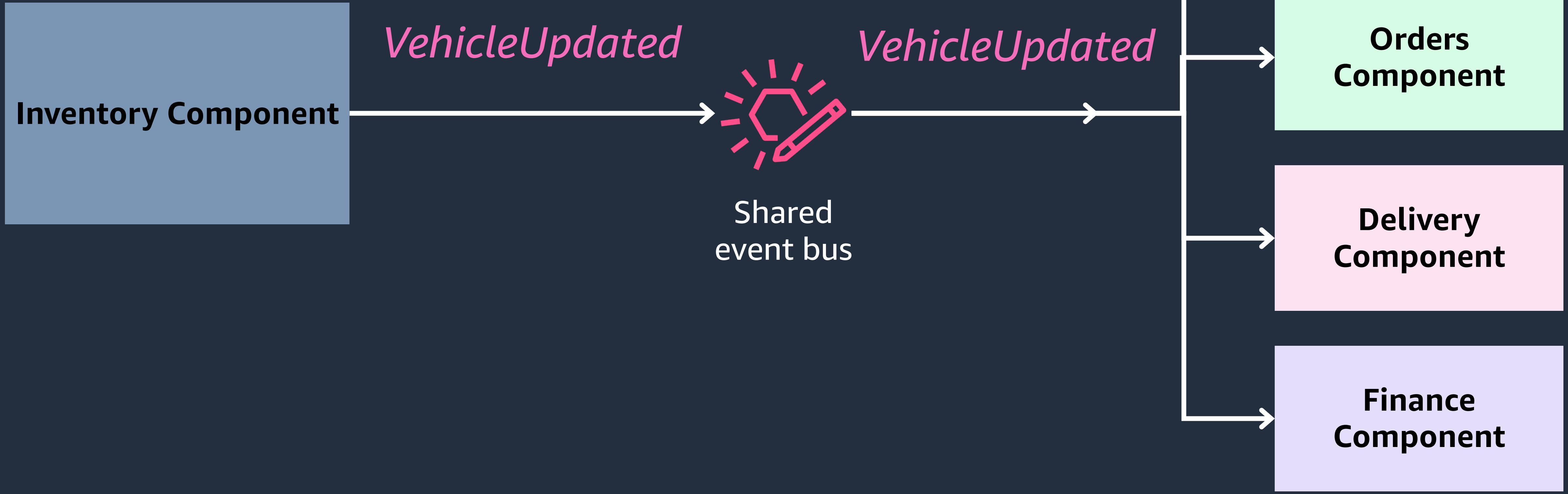

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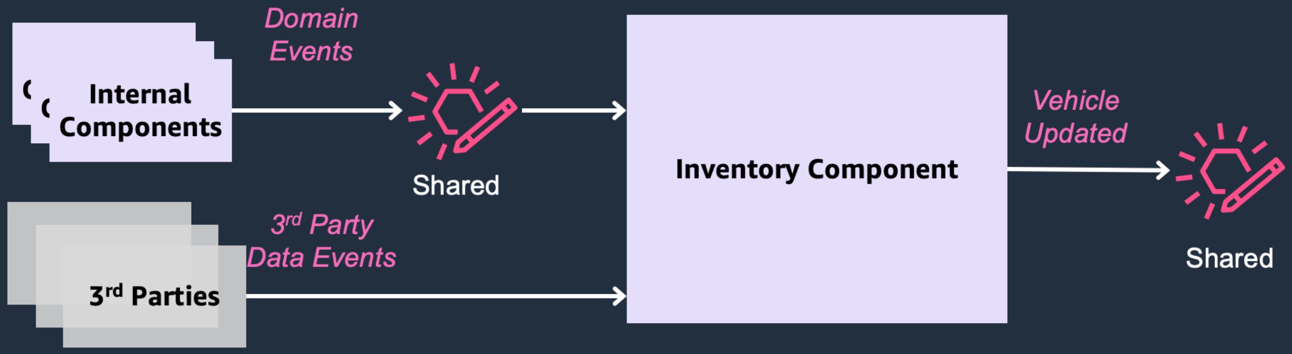
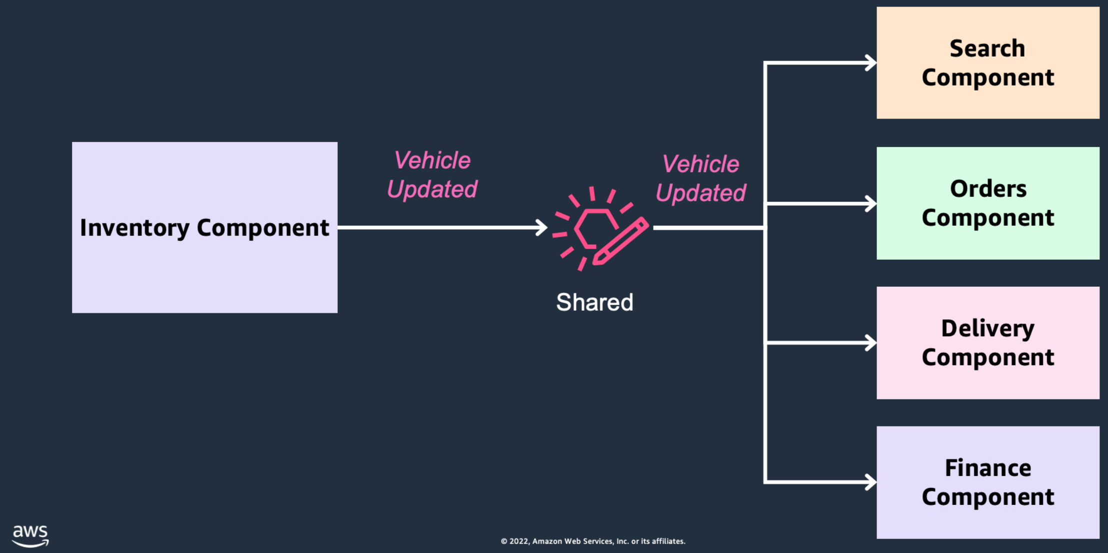


Builds a rich view of a vehicle from diverse events

Publishes “all the things” vehicle in a single event

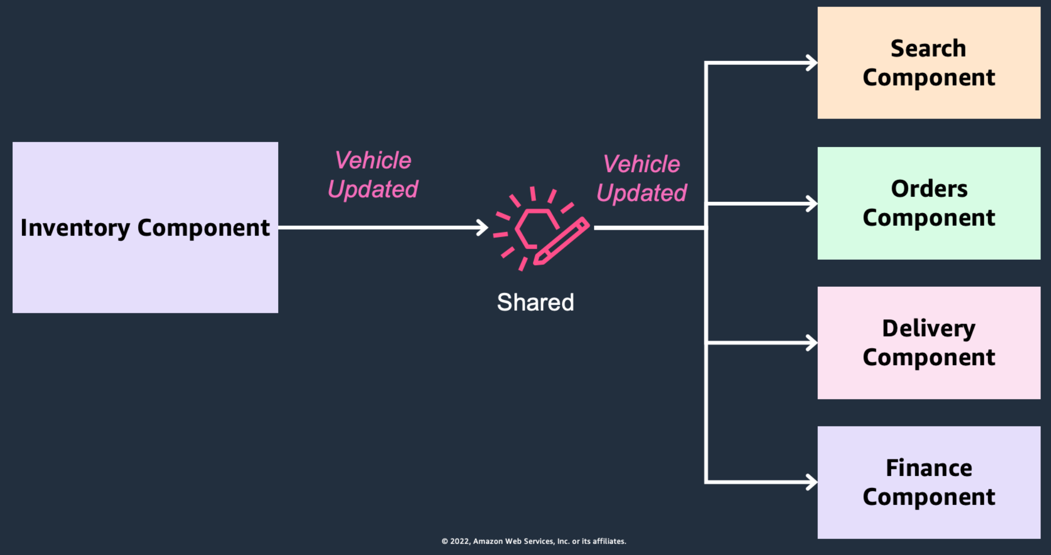
Indirectly defines many states and reports

The God event pattern



- ✅ You can trust you will find all the data you need
- ✅ No need to hit an API to get extra information
- ✅ The only integration point between systems
- ✅ We were scaling a unicorn, it was fast

The God event pattern



🤔 Component & team are accidental proxies of info

🤔 Component coupled with many components for many reasons

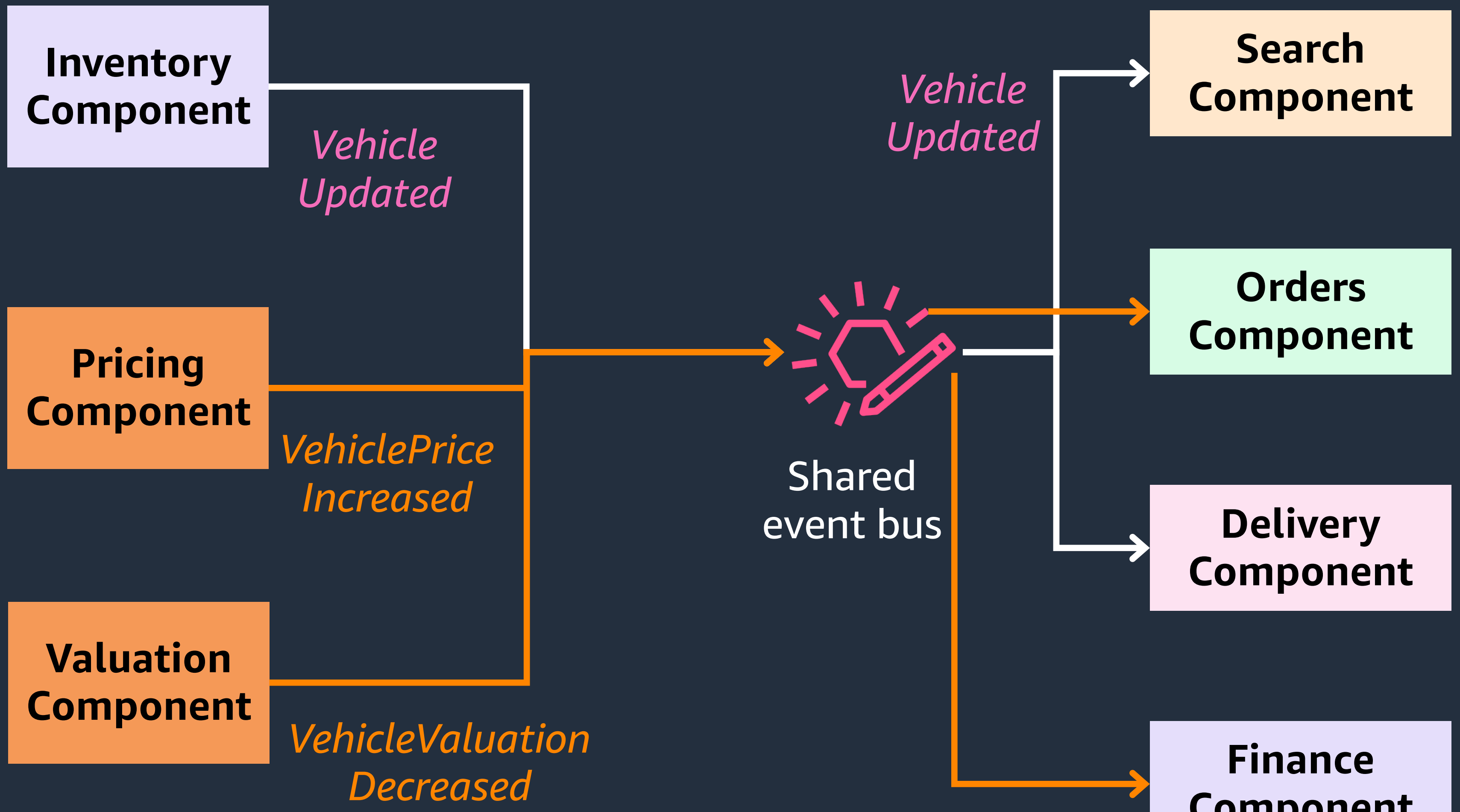
🤔 Change is hard

🤔 When used by reporting systems, you are stuck

🤔 How are we solving this?

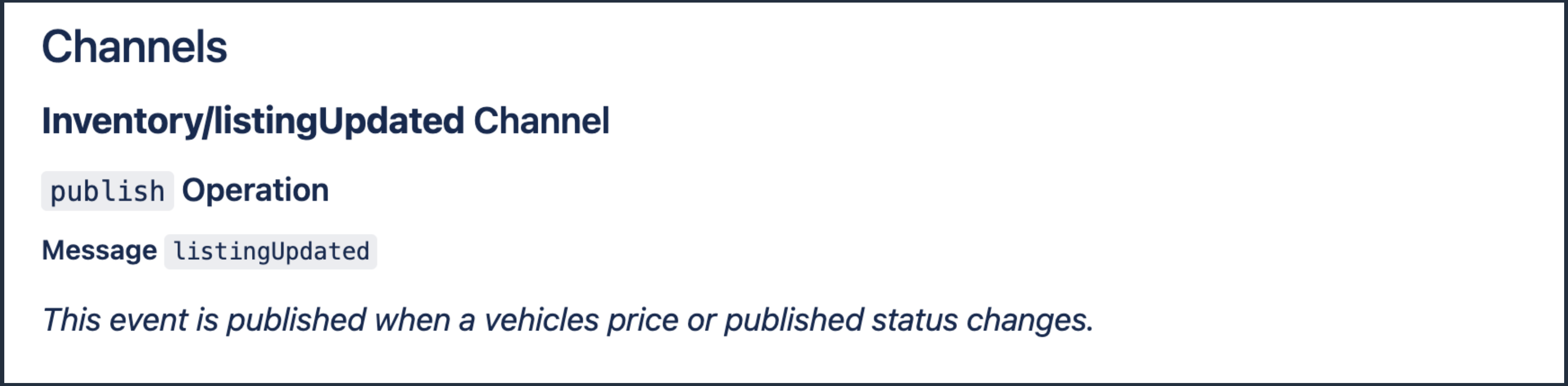
2 Break down the God Event & the mega-components

3 Backwards compatible with God event



1 More specific & contextual events

More specific event name



Channels

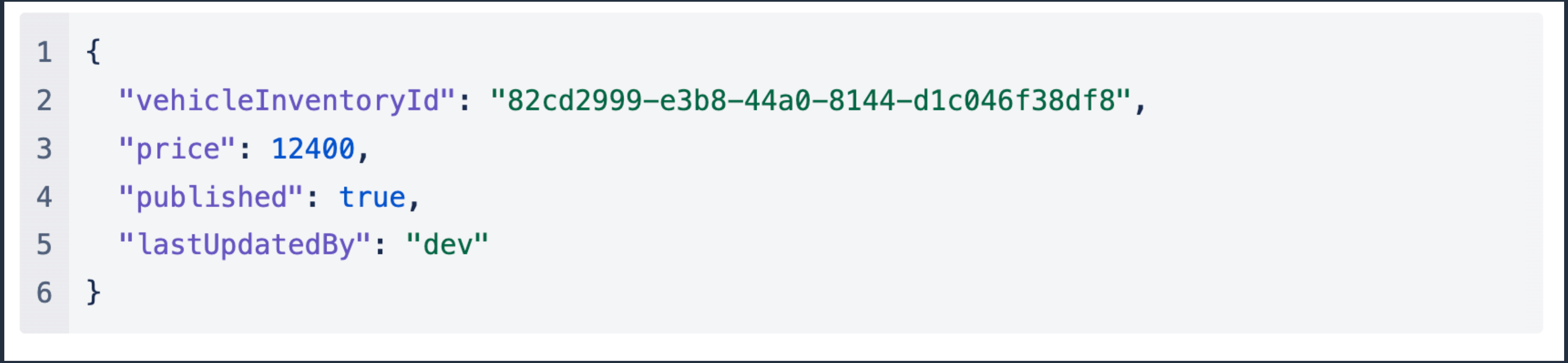
Inventory/listingUpdated Channel

`publish` **Operation**

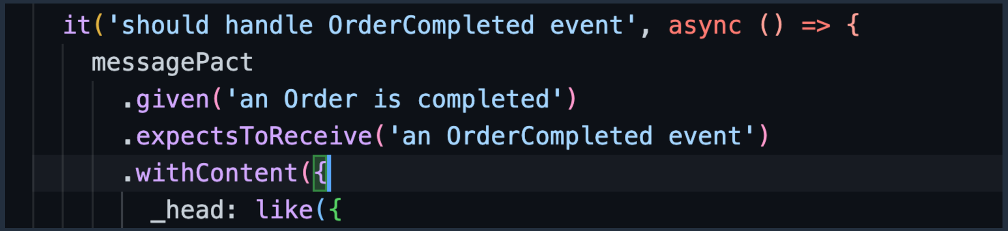
Message `listingUpdated`

This event is published when a vehicles price or published status changes.

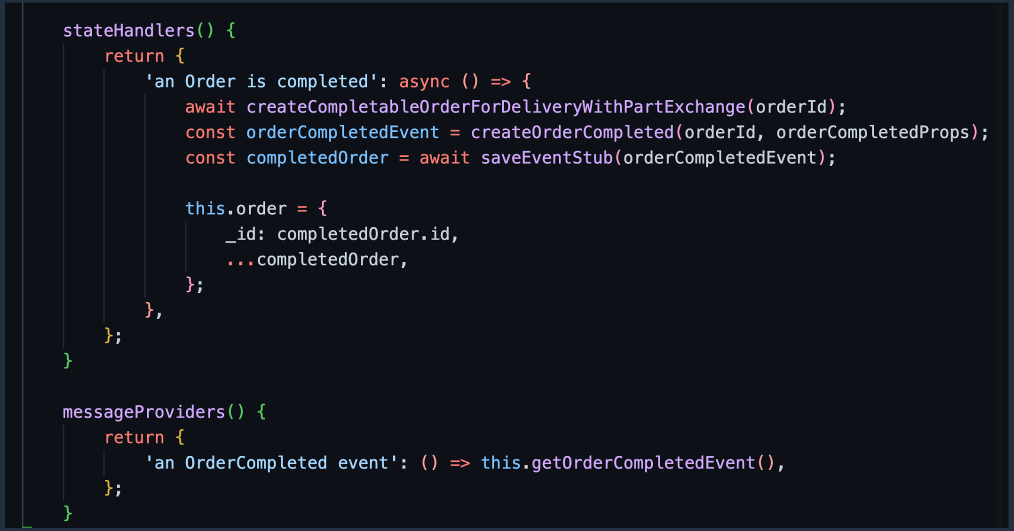
More cohesive context



```
{
  "vehicleInventoryId": "82cd2999-e3b8-44a0-8144-d1c046f38df8",
  "price": 12400,
  "published": true,
  "lastUpdatedBy": "dev"
}
```



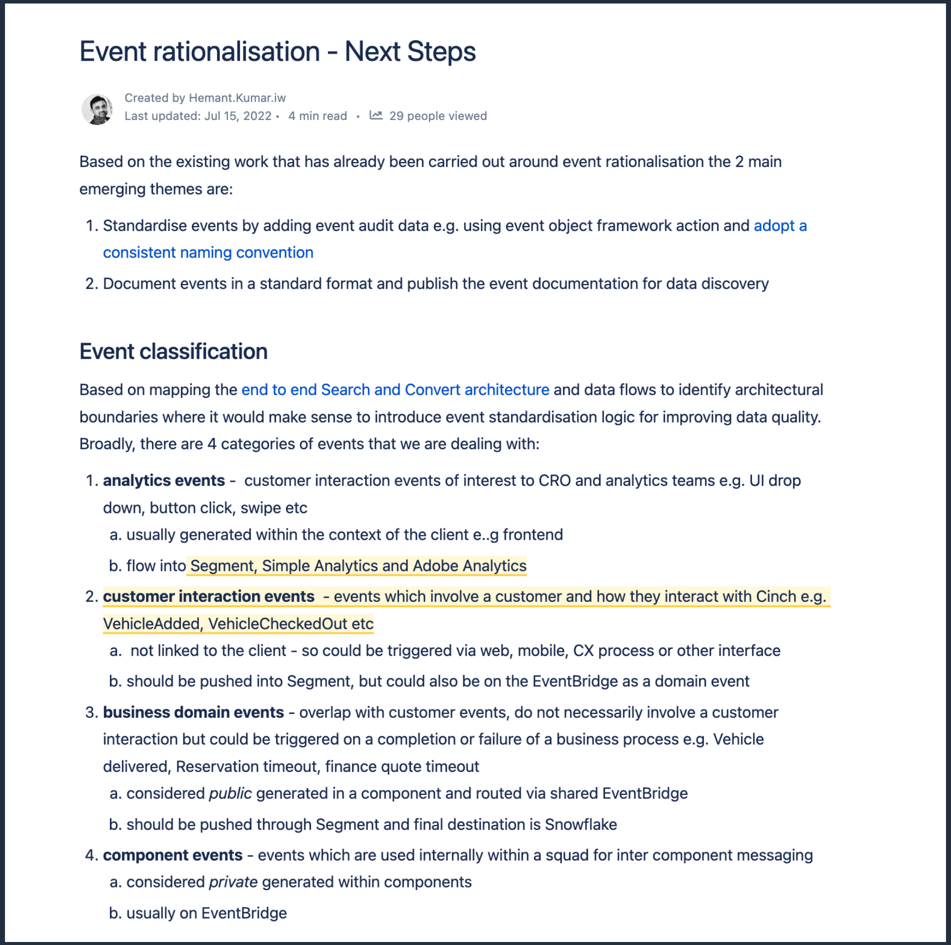
```
it('should handle OrderCompleted event', async () => {
  messagePact
    .given('an Order is completed')
    .expectsToReceive('an OrderCompleted event')
    .withContent({
      _head: like({
```



```
stateHandlers() {
    return {
        'an Order is completed': async () => {
            await createCompletableOrderForDeliveryWithPartExchange(orderId);
            const orderCompletedEvent = createOrderCompleted(orderId, orderCompletedProps);
            const completedOrder = await saveEventStub(orderCompletedEvent);

            this.order = {
                _id: completedOrder.id,
                ...completedOrder,
            };
        },
    };
}

messageProviders() {
    return {
        'an OrderCompleted event': () => this.getOrderCompletedEvent(),
    };
}
```



Event rationalisation - Next Steps

Created by Hemant.Kumar.iw
Last updated: Jul 15, 2022 • 4 min read • 29 people viewed

Based on the existing work that has already been carried out around event rationalisation the 2 main emerging themes are:

1. Standardise events by adding event audit data e.g. using event object framework action and adopt a consistent naming convention
2. Document events in a standard format and publish the event documentation for data discovery

Event classification

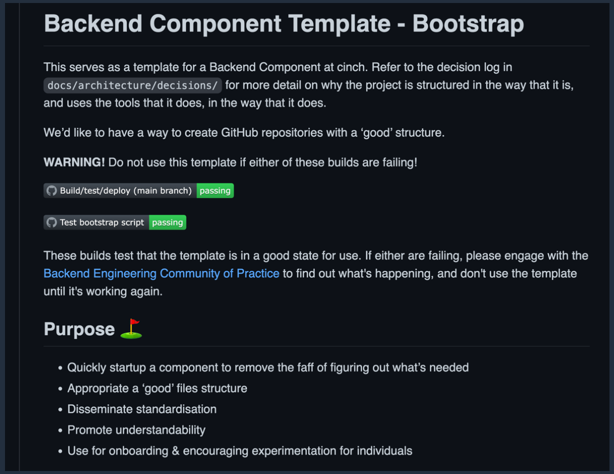
Based on mapping the end to end Search and Convert architecture and data flows to identify architectural boundaries where it would make sense to introduce event standardisation logic for improving data quality. Broadly, there are 4 categories of events that we are dealing with:

1. **analytics events** - customer interaction events of interest to CRO and analytics teams e.g. UI drop down, button click, swipe etc
   a. usually generated within the context of the client e..g frontend
   b. flow into Segment, Simple Analytics and Adobe Analytics
2. **customer interaction events** - events which involve a customer and how they interact with Cinch e.g. VehicleAdded, VehicleCheckedOut etc
   a. not linked to the client - so could be triggered via web, mobile, CX process or other interface
   b. should be pushed into Segment, but could also be on the EventBridge as a domain event
3. **business domain events** - overlap with customer events, do not necessarily involve a customer interaction but could be triggered on a completion or failure of a business process e.g. Vehicle delivered, Reservation timeout, finance quote timeout
   a. considered *public* generated in a component and routed via shared EventBridge
   b. should be pushed through Segment and final destination is Snowflake
4. **component events** - events which are used internally within a squad for inter component messaging
   a. considered *private* generated within components
   b. usually on EventBridge

✚

Contract testing between components

Event rationalization



Backend Component Template - Bootstrap

This serves as a template for a Backend Component at cinch. Refer to the decision log in `docs/architecture/decisions/` for more detail on why the project is structured in the way that it is, and uses the tools that it does, in the way that it does.

We'd like to have a way to create GitHub repositories with a 'good' structure.

WARNING! Do not use this template if either of these builds are failing!

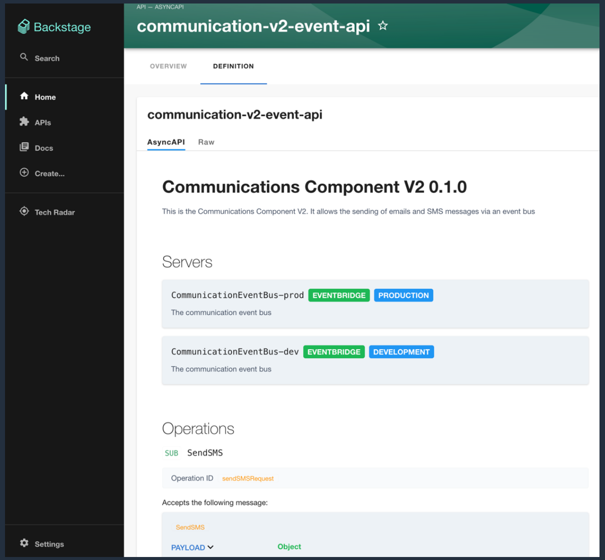
Build/test/deploy (main branch) passing

Test bootstrap script passing

These builds test that the template is in a good state for use. If either are failing, please engage with the Backend Engineering Community of Practice to find out what's happening, and don't use the template until it's working again.

Purpose ⛳

- Quickly startup a component to remove the faff of figuring out what's needed
- Appropriate a 'good' files structure
- Disseminate standardisation
- Promote understandability
- Use for onboarding & encouraging experimentation for individuals



communication-v2-event-api

Communications Component V2 0.1.0

This is the Communications Component V2. It allows the sending of emails and SMS messages via an event bus

Servers

`CommunicationEventBus-prod` EVENTBRIDGE PRODUCTION

The communication event bus

`CommunicationEventBus-dev` EVENTBRIDGE DEVELOPMENT

The communication event bus

Operations

SUB SendSMS

Operation ID sendSMSRequest

Accepts the following message:

SendSMS

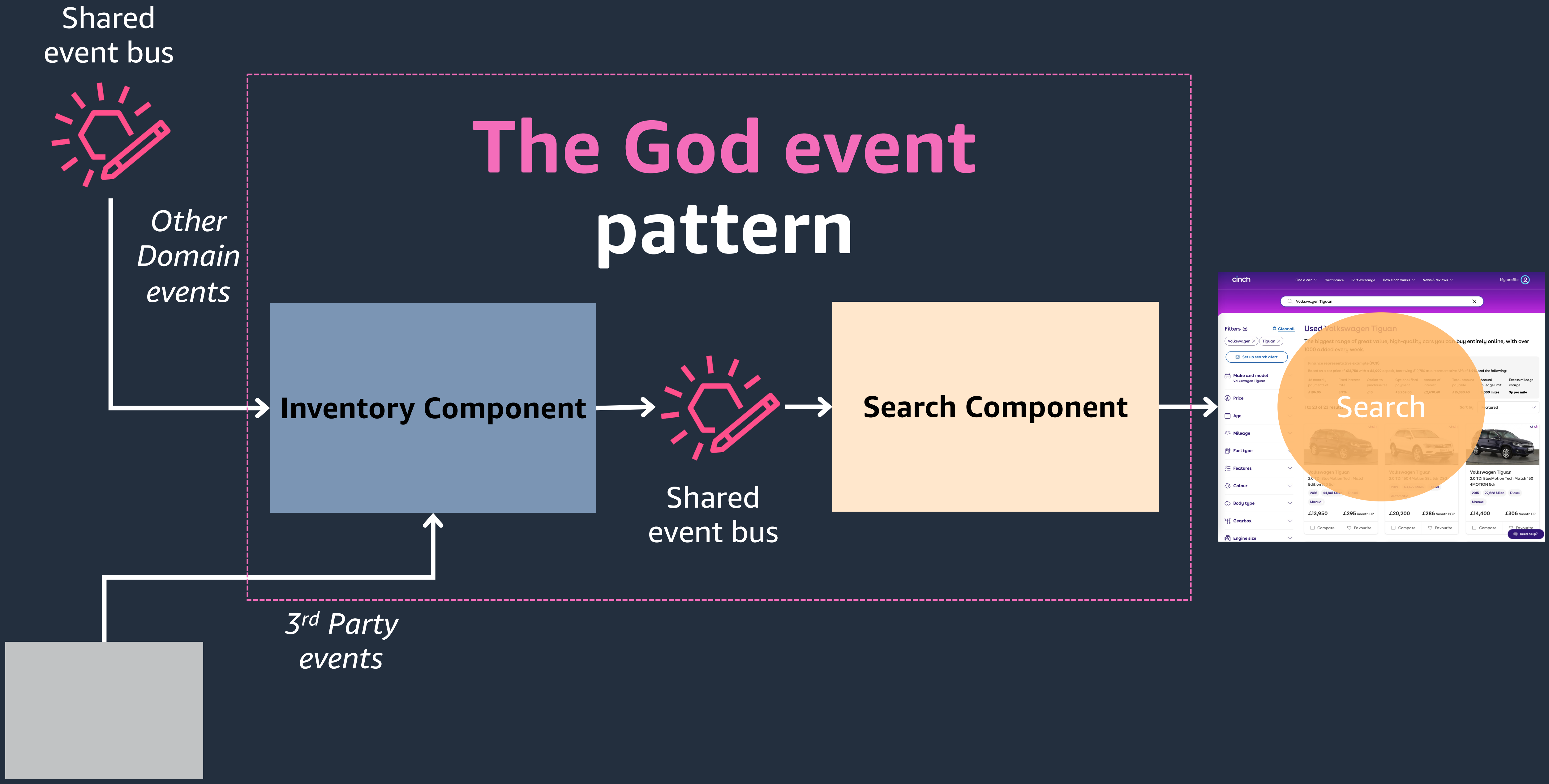
PAYLOAD Object

Domain Driven Design Practices

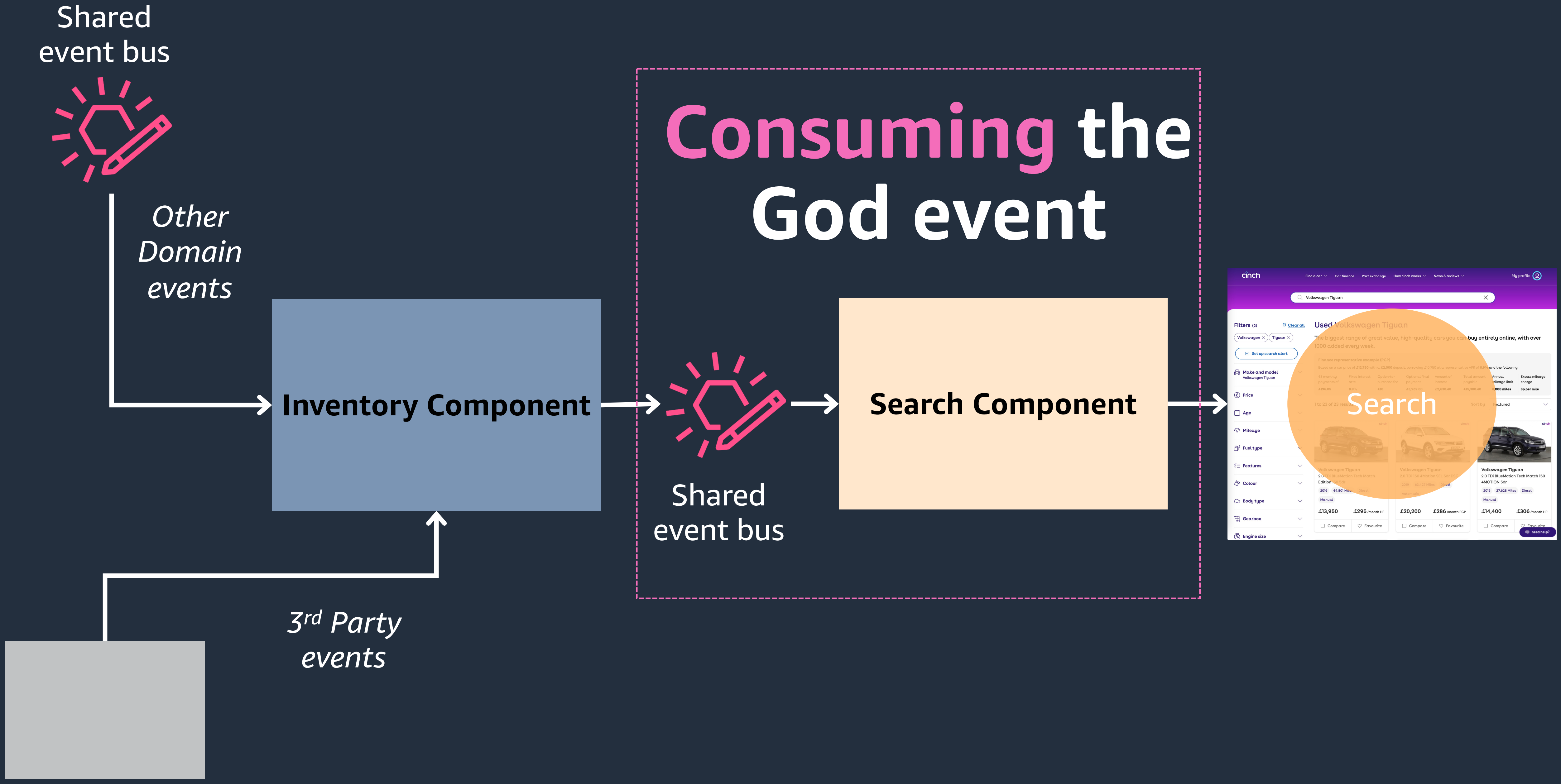
cinch Backend Template as Blueprint

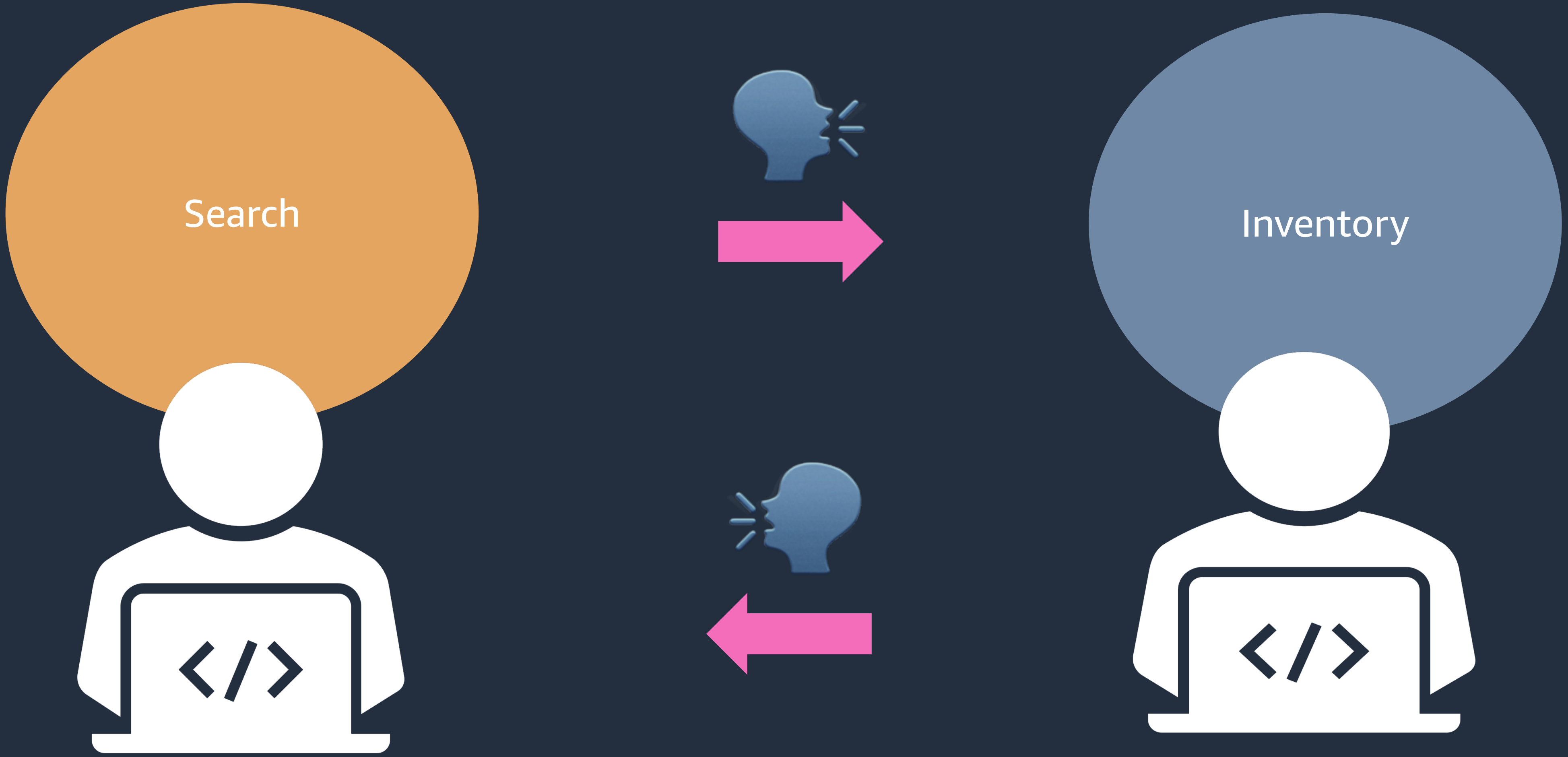
Event discoverability

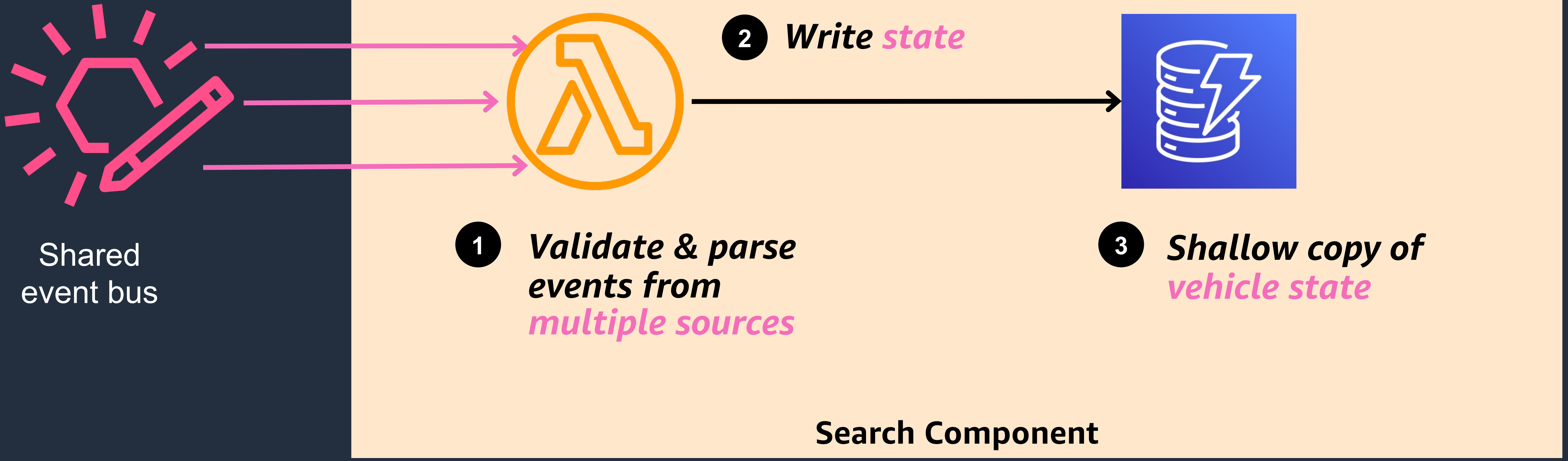
The God event pattern



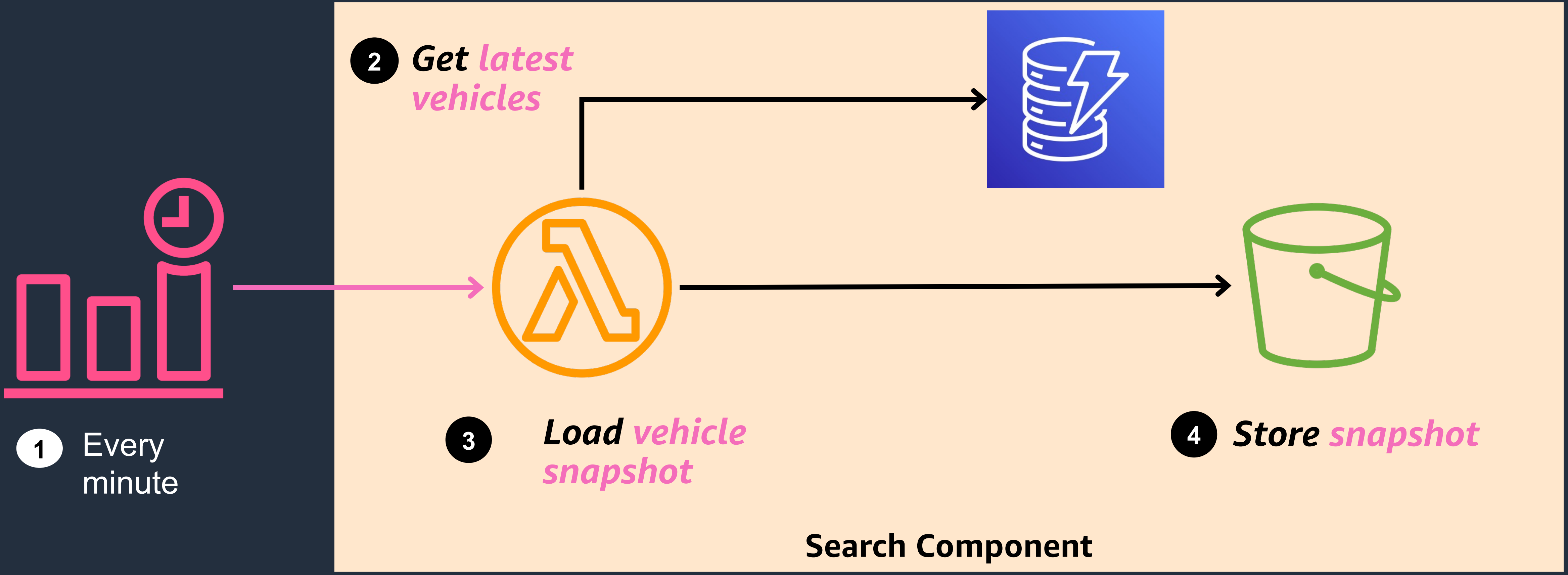
Consuming the God event




Search
Inventory

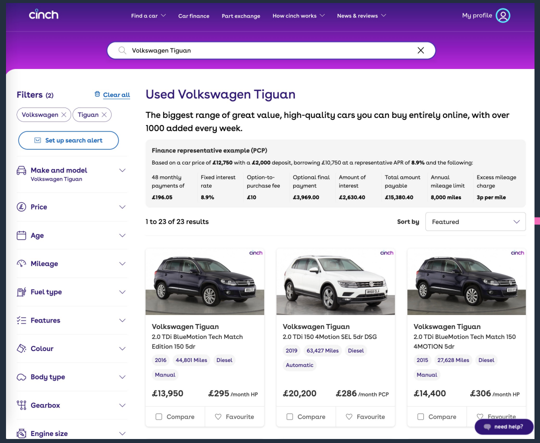

Shared event bus
2 *Write state*
1 *Validate & parse events from multiple sources*
3 *Shallow copy of vehicle state*
Search Component

Search



1 Every minute
2 Get latest vehicles
3 Load vehicle snapshot
4 Store snapshot
Search Component

Search



Used Volkswagen Tiguan

The biggest range of great value, high-quality cars you can buy entirely online, with over 1000 added every week.

Finance representative example (PCP)

Based on a car price of **£12,750** with a **£2,000** deposit, borrowing £10,750 at a representative APR of **8.9%** and the following:

48 monthly payments of	Fixed interest rate	Option-to-purchase fee	Optional final payment	Amount of interest	Total amount payable	Annual mileage limit	Excess mileage charge
£196.05	**8.9%**	**£10**	**£3,969.00**	**£2,630.40**	**£15,380.40**	**8,000 miles**	**3p per mile**

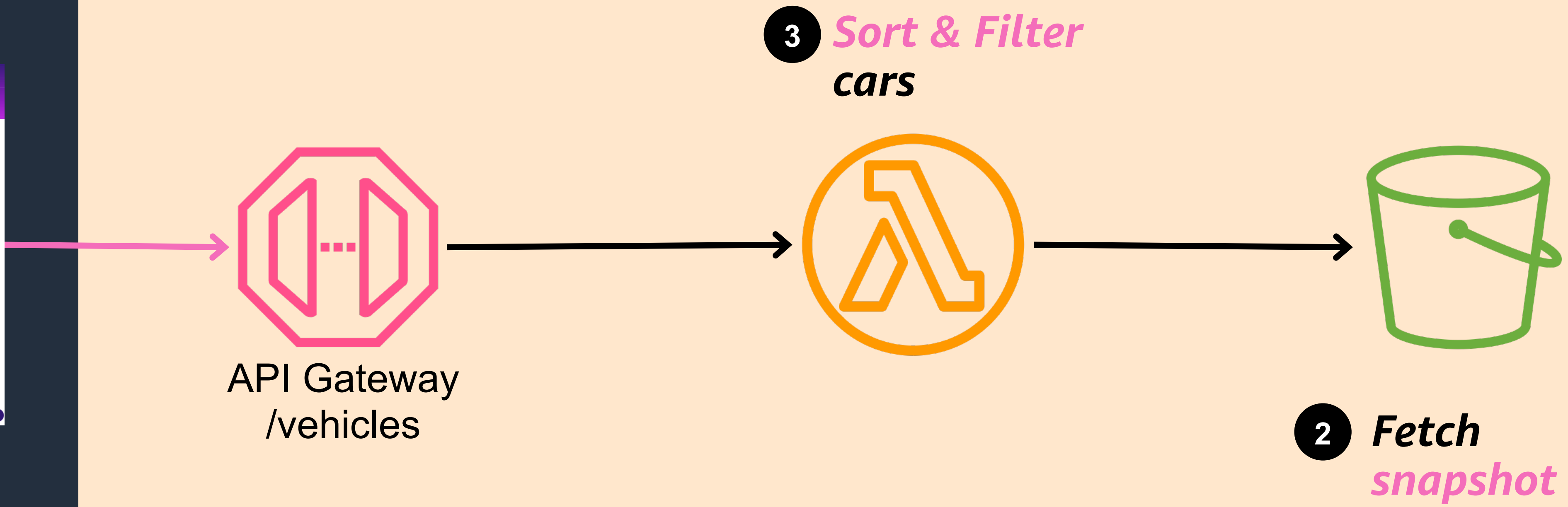
1 to 23 of 23 results

Volkswagen Tiguan
2.0 TDi BlueMotion Tech Match Edition 150 5dr
2016 44,801 Miles Diesel Manual
£13,950 £295 /month HP

Volkswagen Tiguan
2.0 TDi 150 4Motion SEL 5dr DSG
2019 63,427 Miles Diesel Automatic
£20,200 £286 /month PCP

Volkswagen Tiguan
2.0 TDi BlueMotion Tech Match 150 4MOTION 5dr
2015 27,628 Miles Diesel Manual
£14,400 £306 /month HP

1 User searches cars

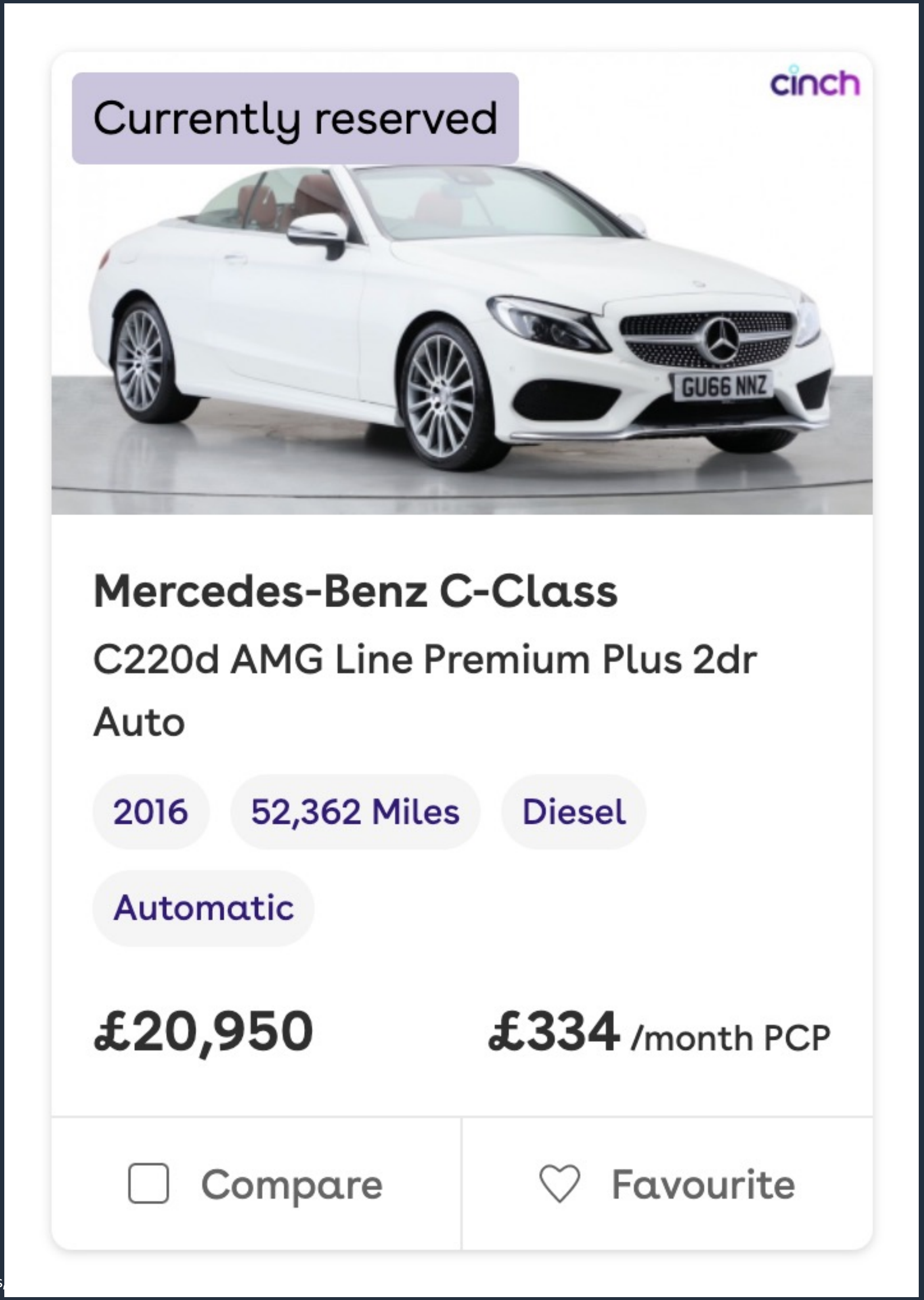


Search Component

1. Systems, teams, tech stack
2. What patterns emerged?
3. How did we evolve our systems?

🤔 How to extend this system?

Marking a car as reserved



Currently reserved

Mercedes-Benz C-Class

C220d AMG Line Premium Plus 2dr Auto

2016 | 52,362 Miles | Diesel | Automatic

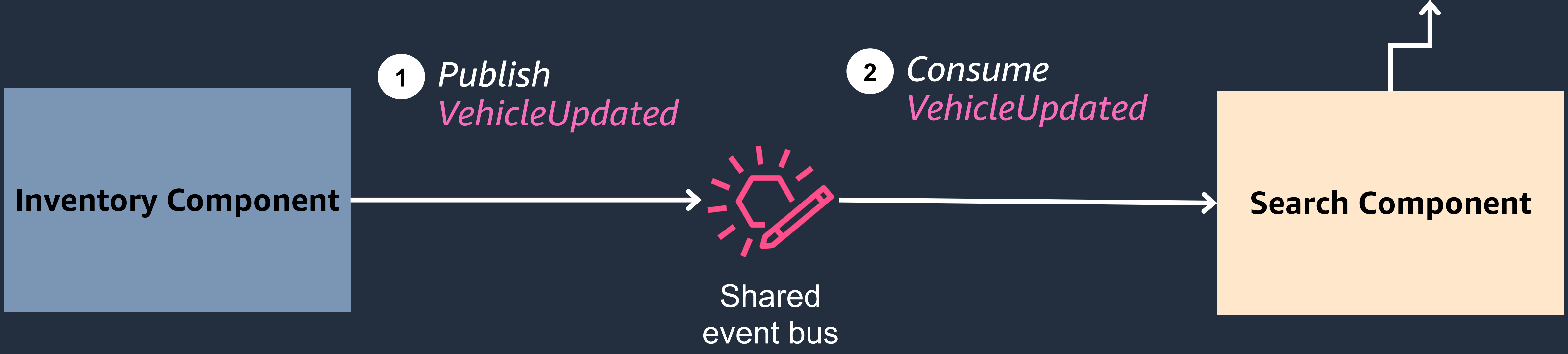
£20,950 £334 /month PCP

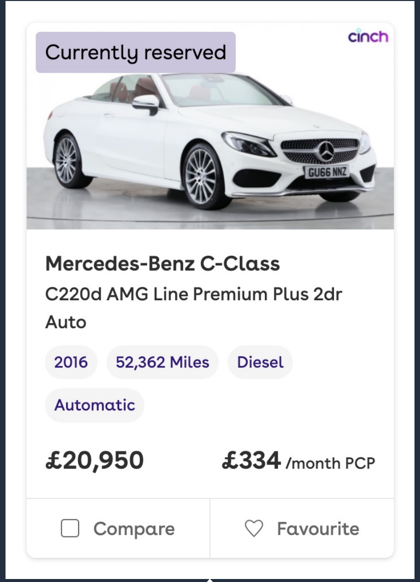
1 *Publish VehicleUpdated*

2 *Consume VehicleUpdated*

3 *Build vehicle snapshot*

4 *Surface cars in search*




Currently reserved

cinch

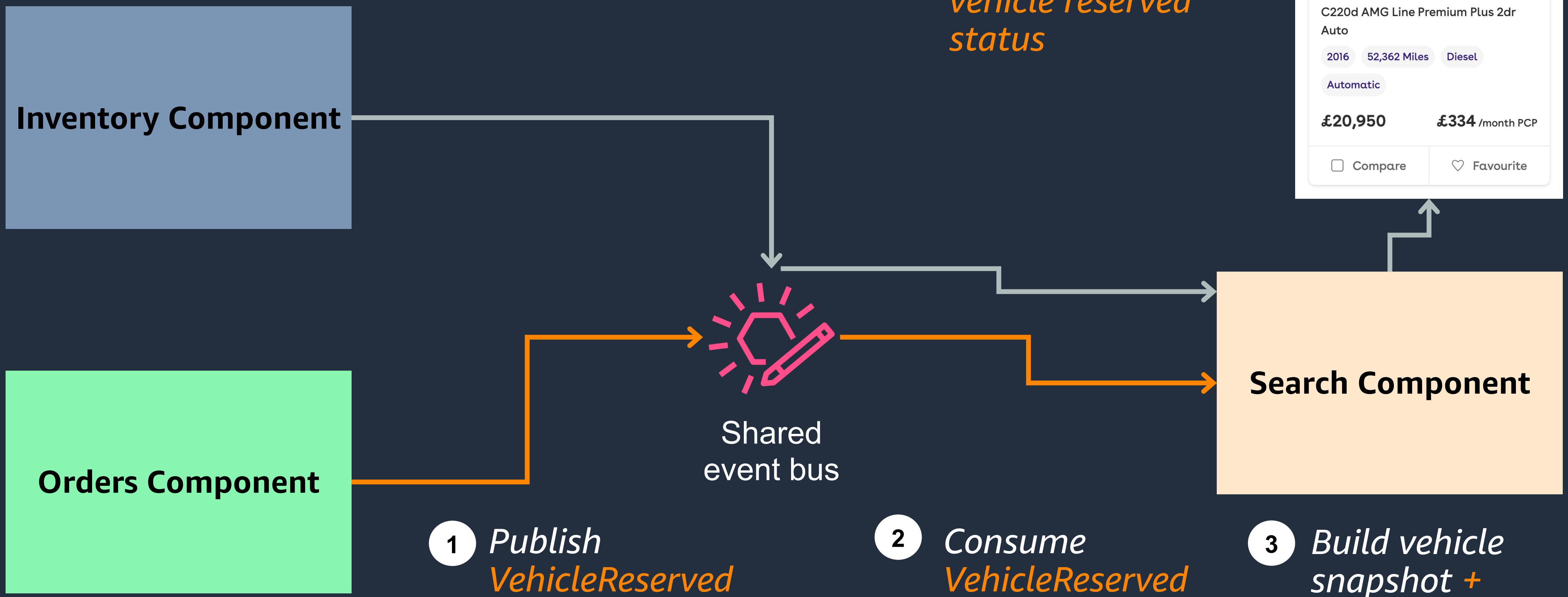
Mercedes-Benz C-Class

C220d AMG Line Premium Plus 2dr Auto

2016 | 52,362 Miles | Diesel | Automatic

£20,950 **£334** /month PCP

Compare Favourite

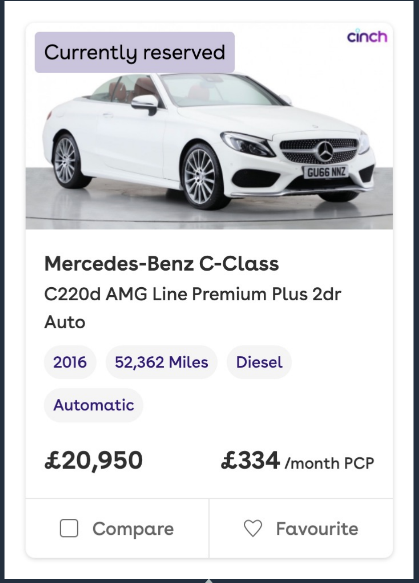


1 *Publish VehicleReserved*

2 *Consume VehicleReserved*

3 *Build vehicle snapshot + vehicle reserved status*

4 *Surface cars in search with vehicle reserved status*


Currently reserved

cinch

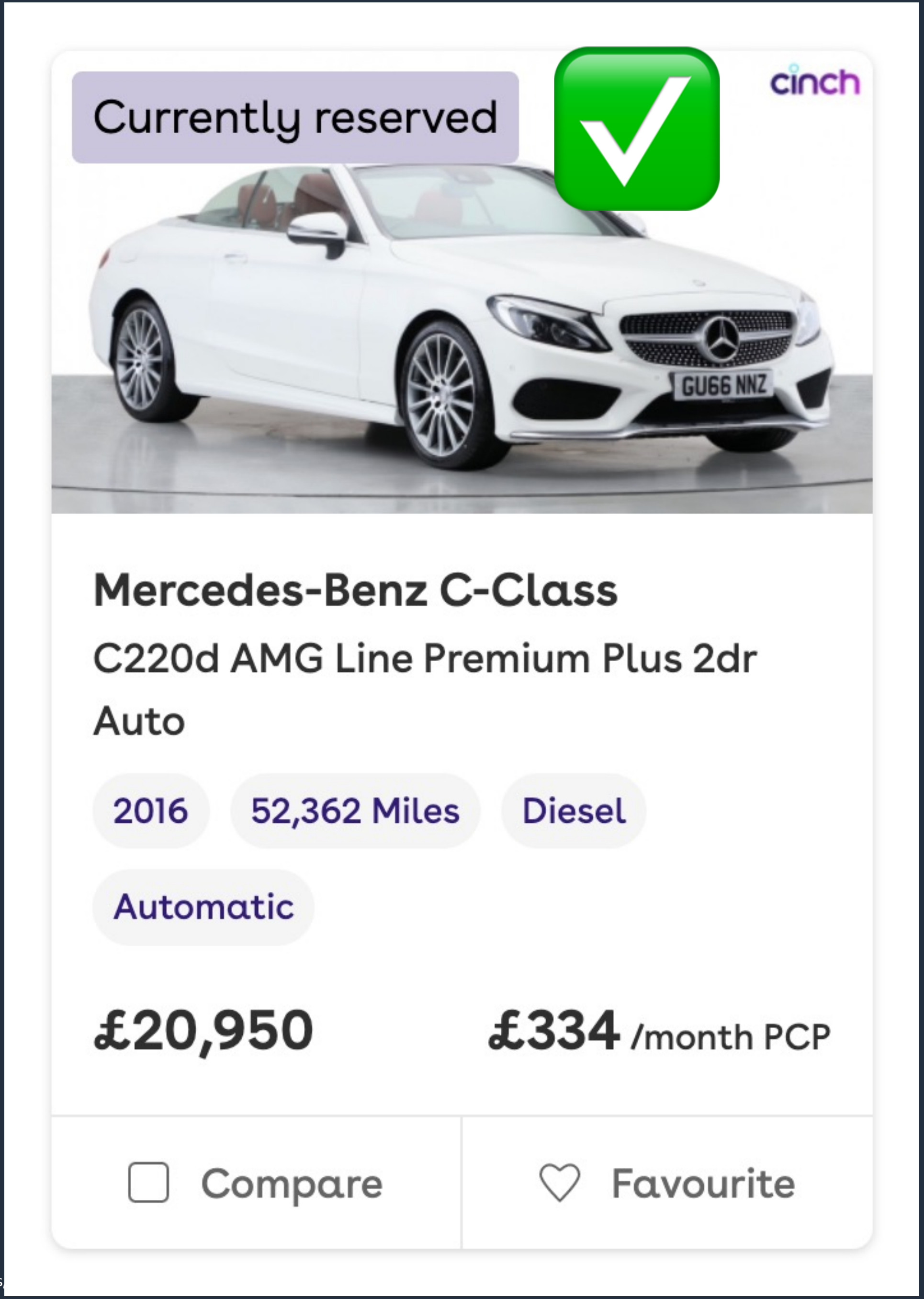
Mercedes-Benz C-Class
C220d AMG Line Premium Plus 2dr Auto

2016 | 52,362 Miles | Diesel | Automatic

£20,950 **£334** /month PCP

Compare Favourite

Marked a car as reserved



Currently reserved ✅

cinch

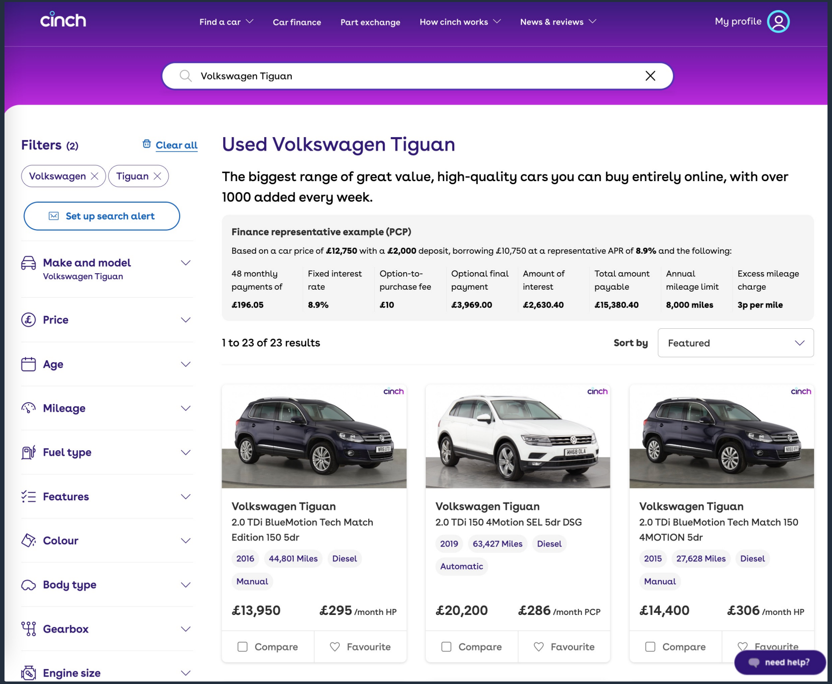
Mercedes-Benz C-Class

C220d AMG Line Premium Plus 2dr Auto

2016 52,362 Miles Diesel Automatic

£20,950 £334 /month PCP

🤔 How to evolve this system?



Volkswagen Tiguan

Filters (2) Clear all

Volkswagen × Tiguan ×

Set up search alert

Make and model
Volkswagen Tiguan

Price

Age

Mileage

Fuel type

Features

Colour

Body type

Gearbox

Engine size

Used Volkswagen Tiguan

The biggest range of great value, high-quality cars you can buy entirely online, with over 1000 added every week.

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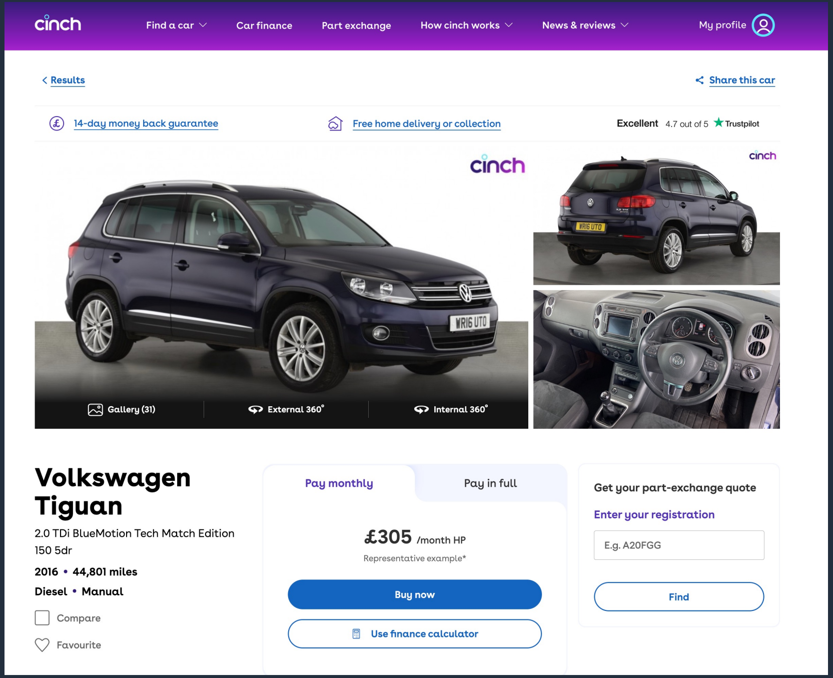
1 to 23 of 23 results

Sort by Featured

Volkswagen Tiguan	Volkswagen Tiguan	Volkswagen Tiguan
2.0 TDi BlueMotion Tech Match Edition 150 5dr	2.0 TDi 150 4Motion SEL 5dr DSG	2.0 TDi BlueMotion Tech Match 150 4MOTION 5dr
2016 · 44,801 Miles · Diesel · Manual	2019 · 63,427 Miles · Diesel · Automatic	2015 · 27,628 Miles · Diesel · Manual
£13,950 · £295 /month HP	£20,200 · £286 /month PCP	£14,400 · £306 /month HP
Compare · Favourite	Compare · Favourite	Compare · Favourite



14-day money back guarantee

Free home delivery or collection

Excellent 4.7 out of 5 ★ Trustpilot

Volkswagen Tiguan

2.0 TDi BlueMotion Tech Match Edition 150 5dr

2016 • 44,801 miles

Diesel • Manual

Compare

Favourite

Pay monthly | Pay in full

£305 /month HP

Representative example*

Buy now

Use finance calculator

Get your part-exchange quote

Enter your registration

E.g. A20FGG

Find

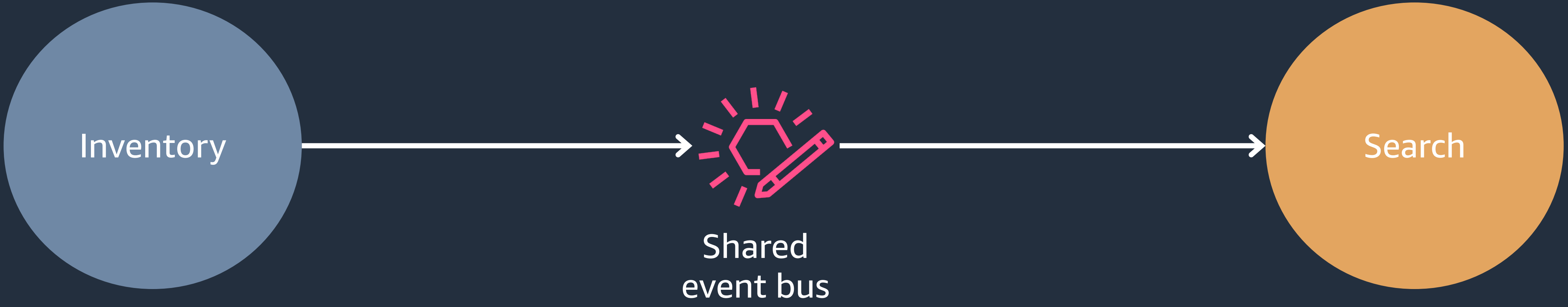
Search & filter for cars

Inventory of cars + Full Page Ad for cars

Search

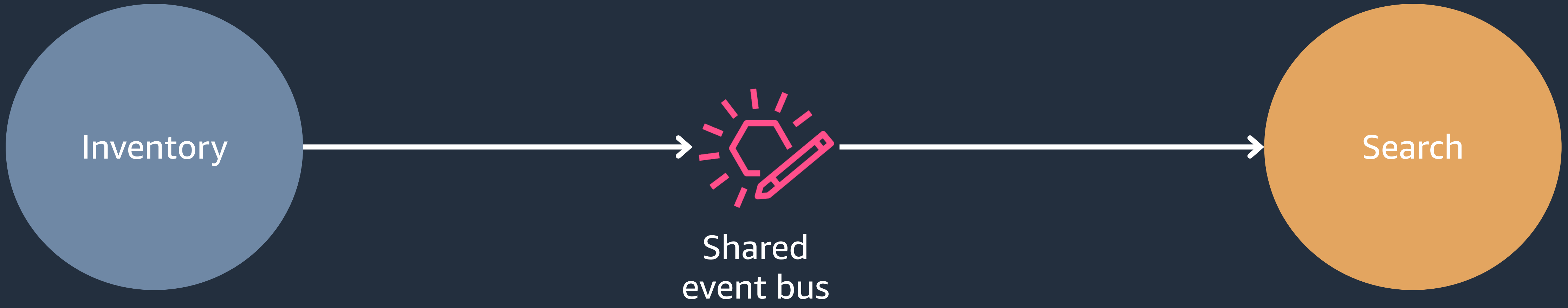
Inventory

✅ Publishes vehicle state for anyone who might care

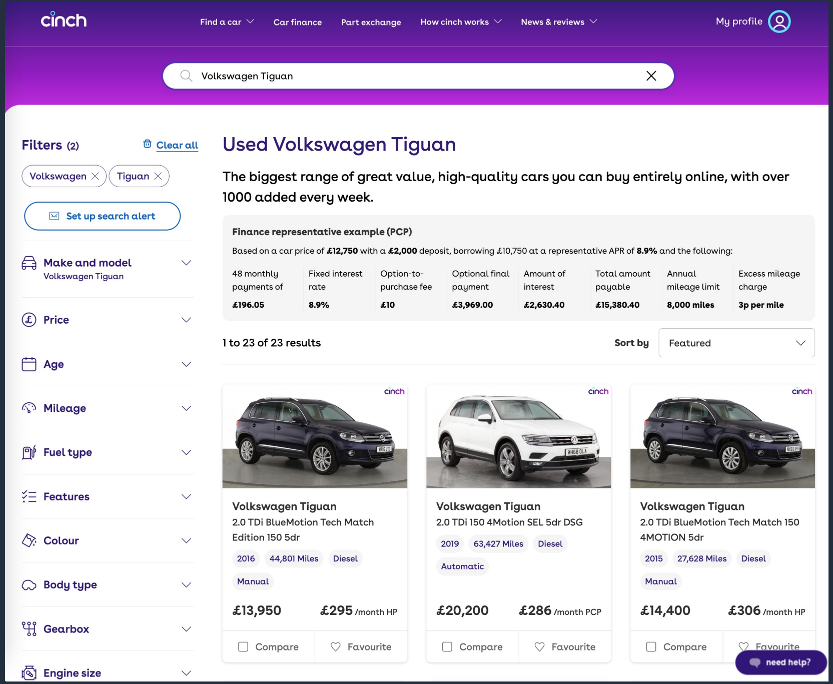


❌ Ends up considering presentation layer

✅ Has control of its own data



❌ Has to consume loads of events


cinch | Find a car | Car finance | Part exchange | How cinch works | News & reviews | My profile

Volkswagen Tiguan

Filters (2) | Clear all

Volkswagen × | Tiguan ×

Set up search alert

Make and model
Volkswagen Tiguan

Price

Age

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Used Volkswagen Tiguan

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1 to 23 of 23 results | Sort by | Featured

Volkswagen Tiguan	Volkswagen Tiguan	Volkswagen Tiguan
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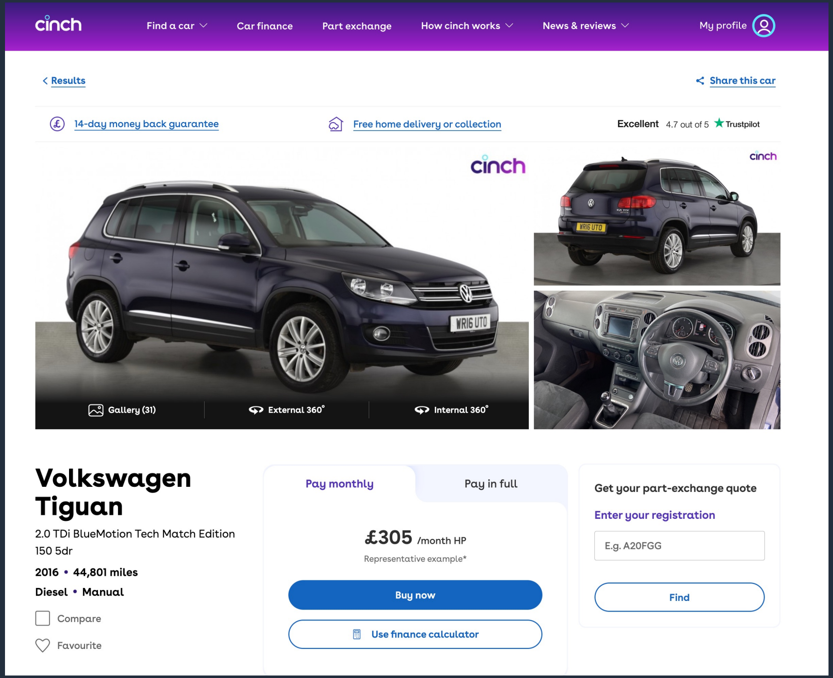
£13,950 · £295 /month HP	£20,200 · £286 /month PCP	£14,400 · £306 /month HP
Compare · Favourite	Compare · Favourite	Compare · Favourite

need help?


cinch | Find a car | Car finance | Part exchange | How cinch works | News & reviews | My profile

< Results | Share this car

14-day money back guarantee | Free home delivery or collection | Excellent 4.7 out of 5 ★ Trustpilot

Gallery (31) | External 360° | Internal 360°

Volkswagen Tiguan

2.0 TDi BlueMotion Tech Match Edition 150 5dr

2016 • 44,801 miles

Diesel • Manual

Compare

Favourite

Pay monthly | Pay in full

£305 /month HP

Representative example*

Buy now

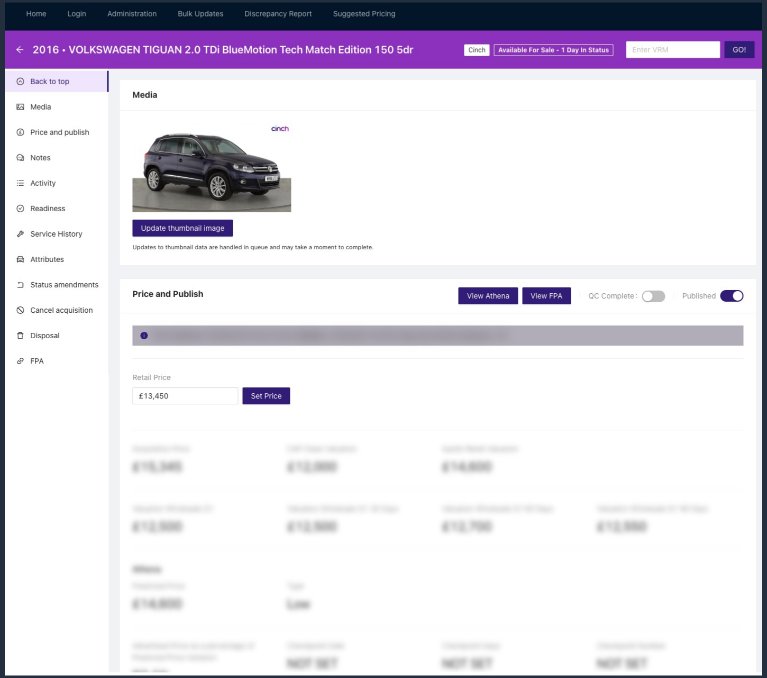
Use finance calculator

Get your part-exchange quote

Enter your registration

E.g. A20FGG

Find


Home | Login | Administration | Bulk Updates | Discrepancy Report | Suggested Pricing

← 2016 • VOLKSWAGEN TIGUAN 2.0 TDi BlueMotion Tech Match Edition 150 5dr | Cinch | Available For Sale - 1 Day In Status | Enter VRM | GO!

Back to top
Media
Price and publish
Notes
Activity
Readiness
Service History
Attributes
Status amendments
Cancel acquisition
Disposal
FPA

Media

Update thumbnail image

Updates to thumbnail data are handled in queue and may take a moment to complete.

Price and Publish | View Athena | View FPA | QC Complete: | Published

[redacted]

Retail Price

£13,450 | Set Price

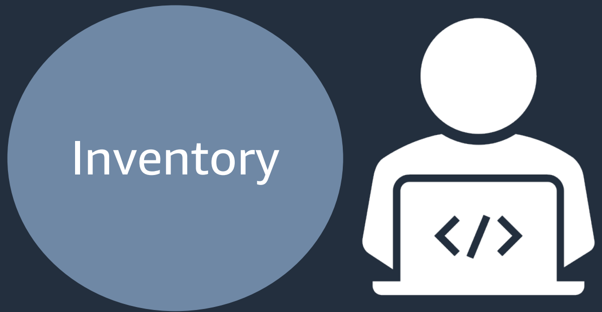
[redacted]

Search & filter for cars

Full Page Ad for cars

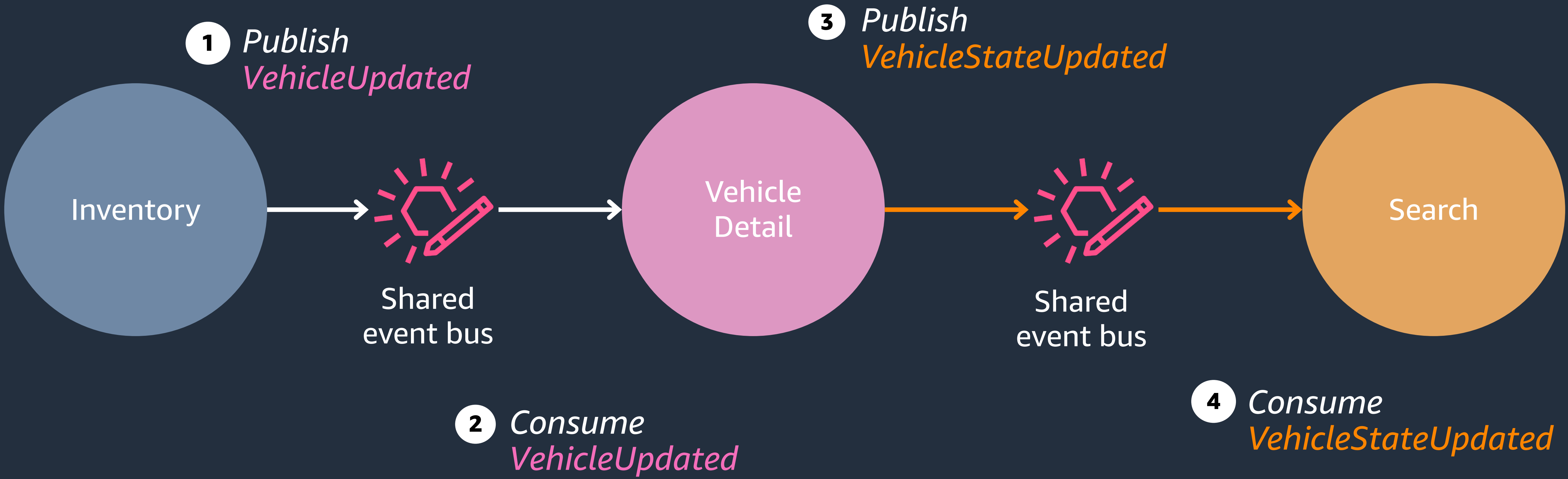
Inventory of cars

Vehicle Detail



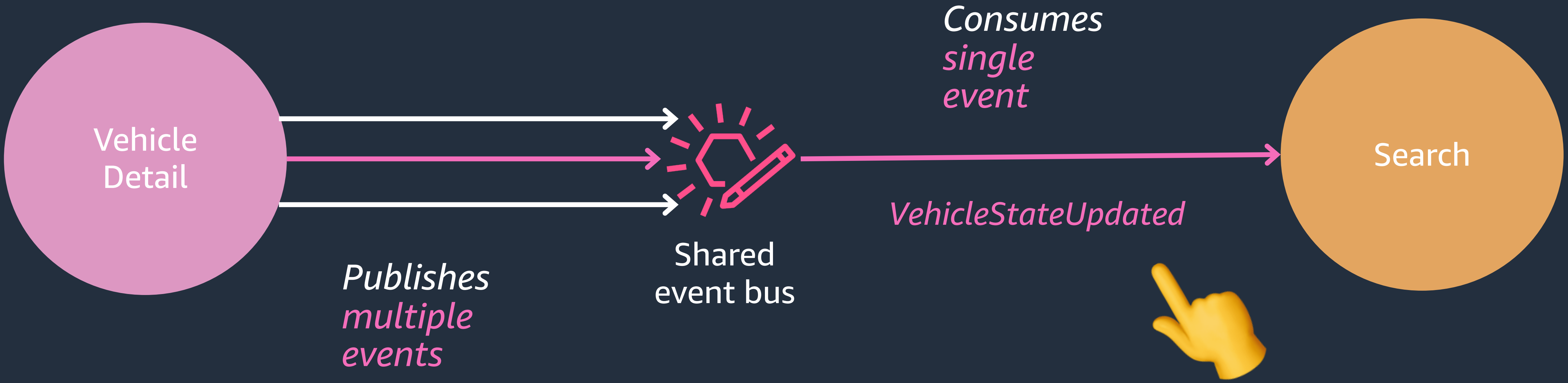
Inventory/VehicleUpdated ➡ VehicleDetail/VehicleStateUpdated

Inventory/ VehicleUpdated → VehicleDetail/ VehicleStateUpdated

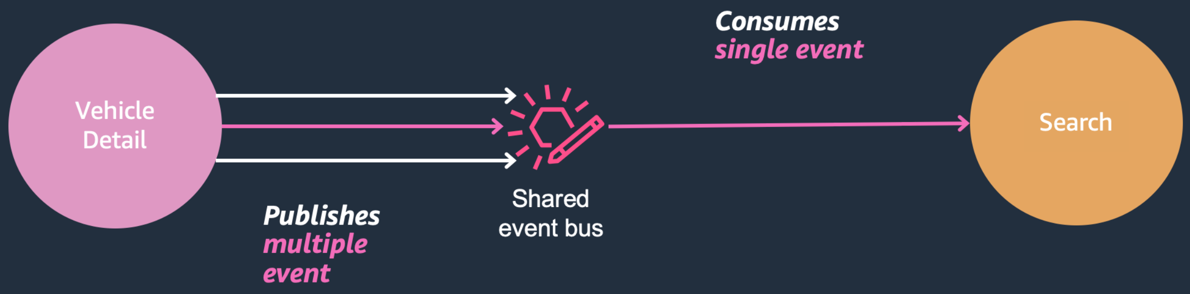


1 *Publish VehicleUpdated*
Inventory
Shared event bus
Vehicle Detail
2 *Consume VehicleUpdated*
3 *Publish VehicleStateUpdated*
Shared event bus
Search
4 *Consume VehicleStateUpdated*

Lazy consumer pattern

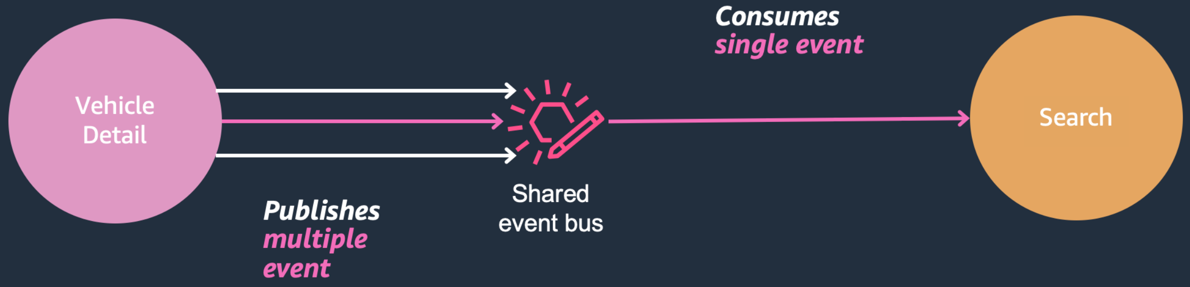


Lazy consumer pattern



- ✅ Only cares about one event
- ✅ Only speaks to one team
- ✅ Coupled with more suitable system
- ✅ Focuses on what makes them awesome

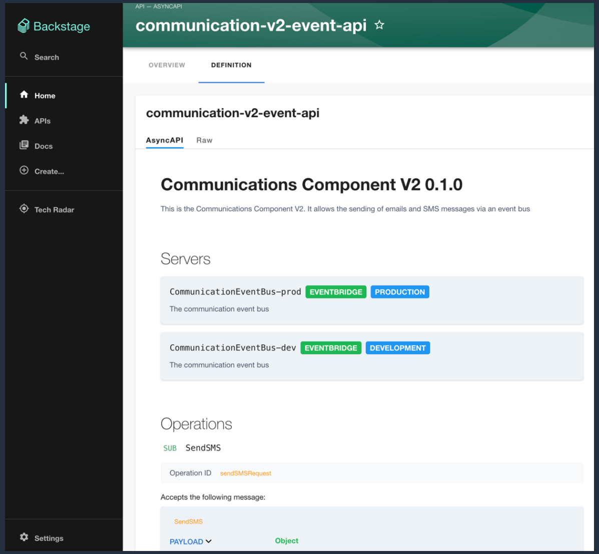
Lazy consumer pattern



- 🤔 Does not control its destiny
- 🤔 Relies on documentation
- 🤔 Has to translate data again
- 🤔 What if the event stops getting published?

🤔 How are we solving this?

PACTFLOW



API — ASYNCAPI

communication-v2-event-api ☆

communication-v2-event-api

Communications Component V2 0.1.0

This is the Communications Component V2. It allows the sending of emails and SMS messages via an event bus

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`CommunicationEventBus-prod` EVENTBRIDGE PRODUCTION

The communication event bus

`CommunicationEventBus-dev` EVENTBRIDGE DEVELOPMENT

The communication event bus

Operations

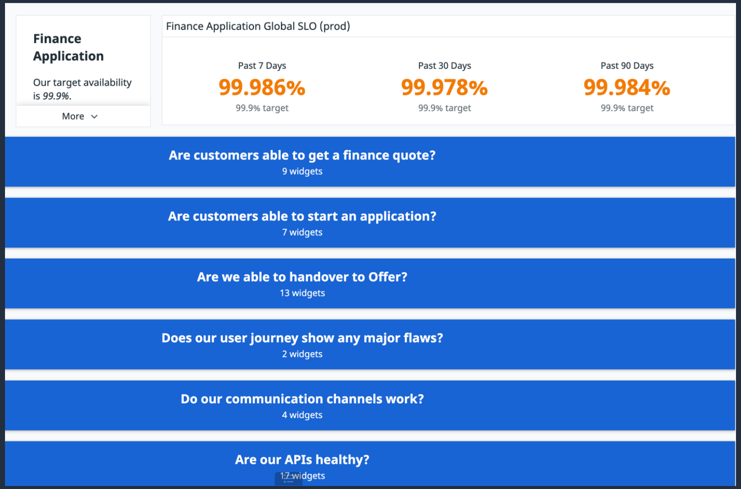
SUB `SendSMS`

Operation ID sendSMSRequest

Accepts the following message:

SendSMS

PAYLOAD Object



Finance Application

Our target availability is *99.9%*.

Finance Application Global SLO (prod)

Past 7 Days	Past 30 Days	Past 90 Days
99.986%	99.978%	99.984%
99.9% target	99.9% target	99.9% target

Are customers able to get a finance quote?
9 widgets

Are customers able to start an application?
7 widgets

Are we able to handover to Offer?
13 widgets

Does our user journey show any major flaws?
2 widgets

Do our communication channels work?
4 widgets

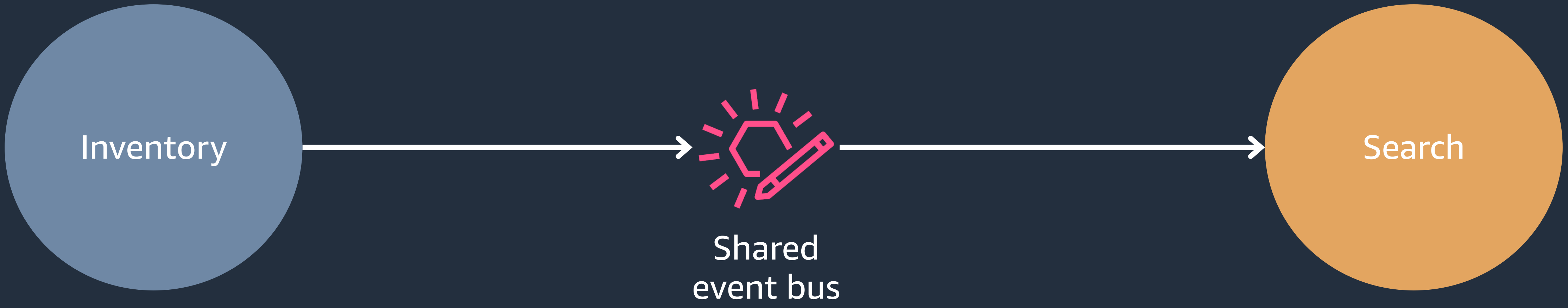
Are our APIs healthy?
17 widgets

Contract testing

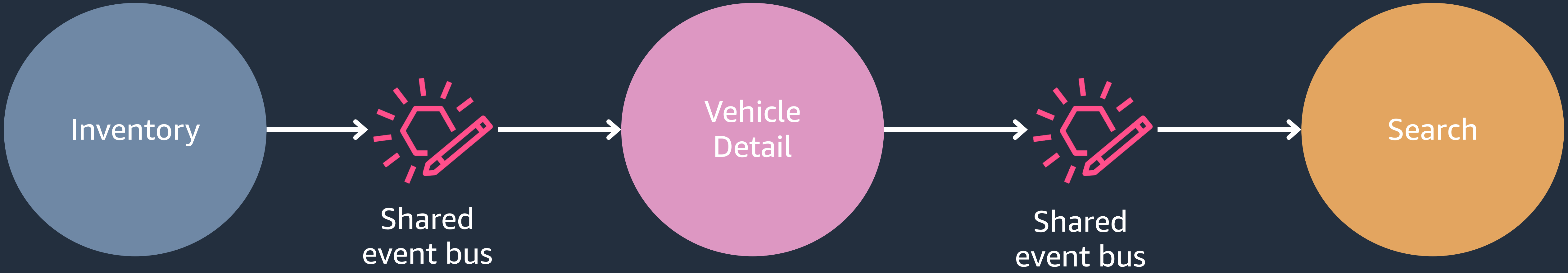
Documenting events

Observability practices

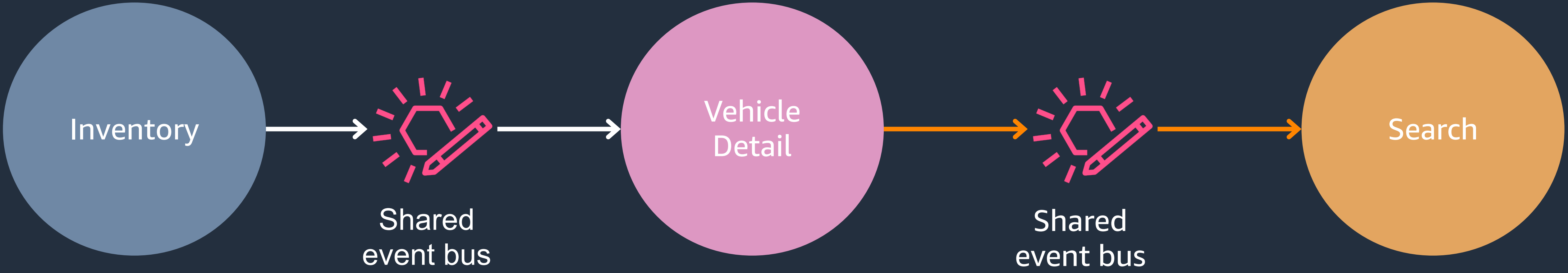
What did this mean for teams?



A few weeks later

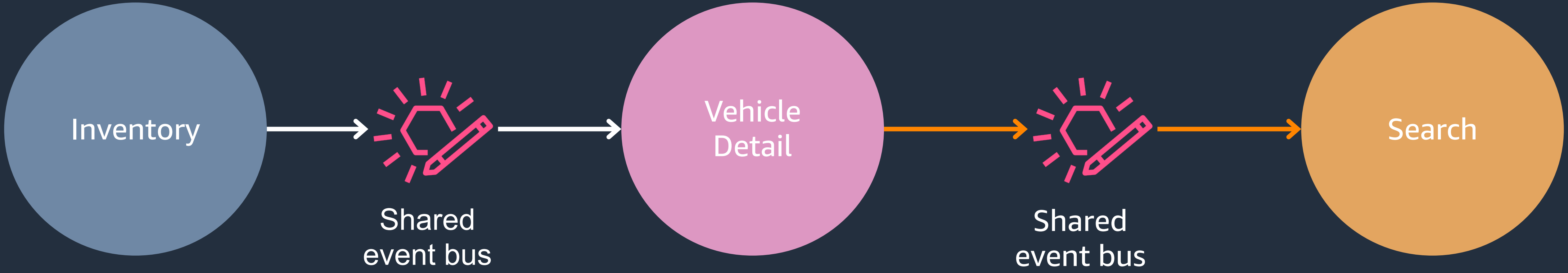


✅ Can focus on inventory



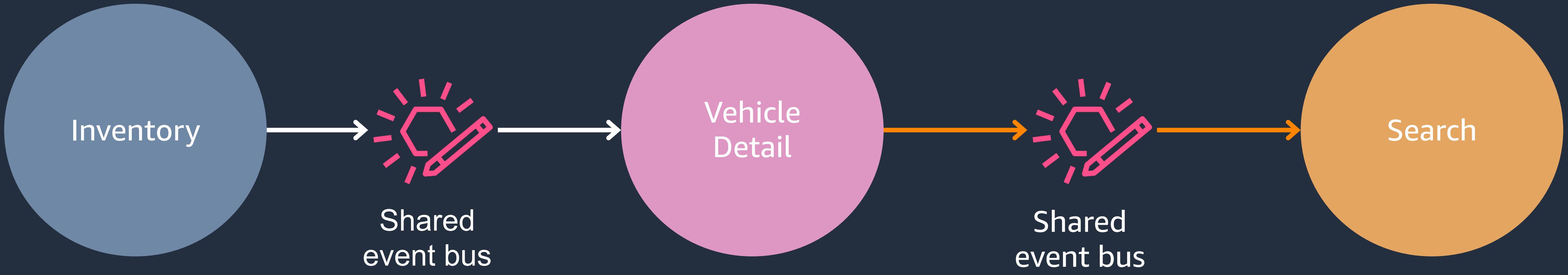
❌ Gets a new consumer

✅ Has control of its own data



❌ Accepts complexity in favour of consumers

✅ Conversations, events reduced to one



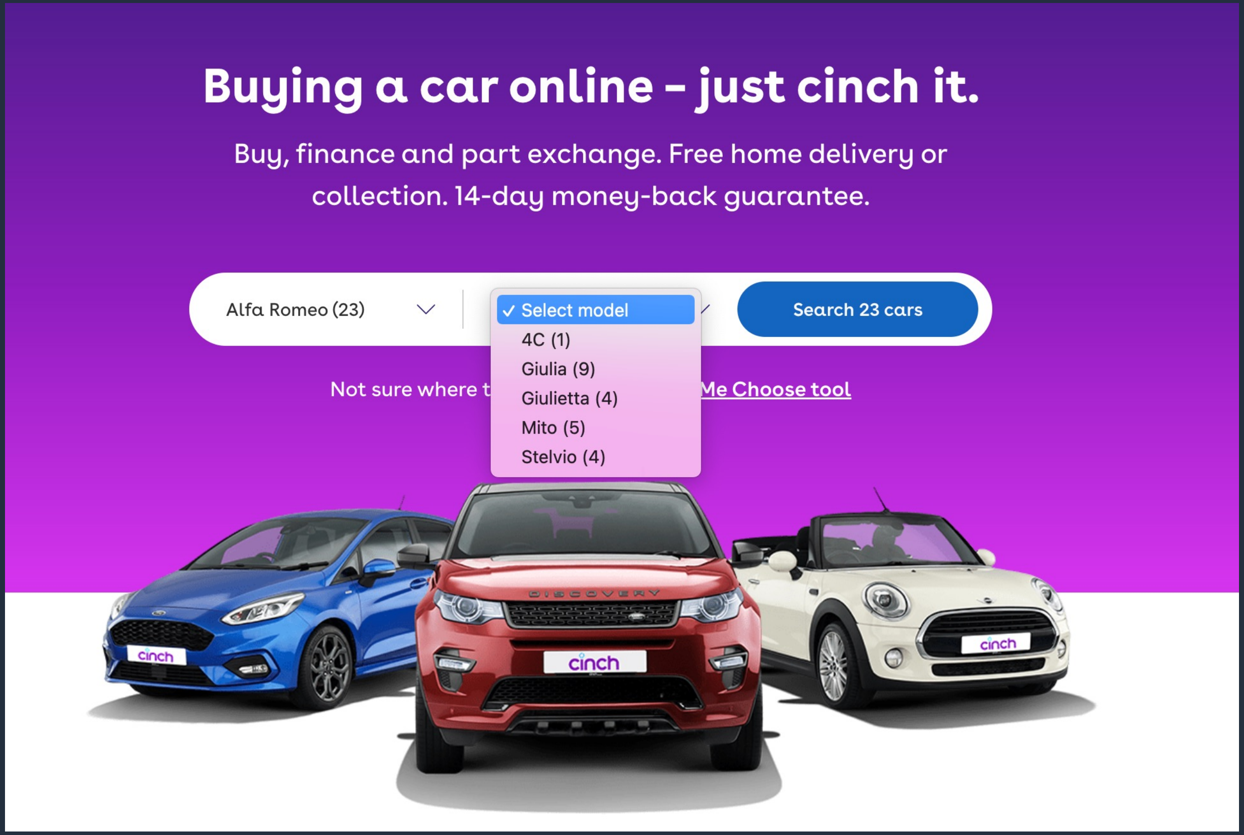
❌ Relies heavily on Vehicle Detail

🚗 Inventory could focus on the car and its status

💿 Vehicle Detail had ownership of its own car detail

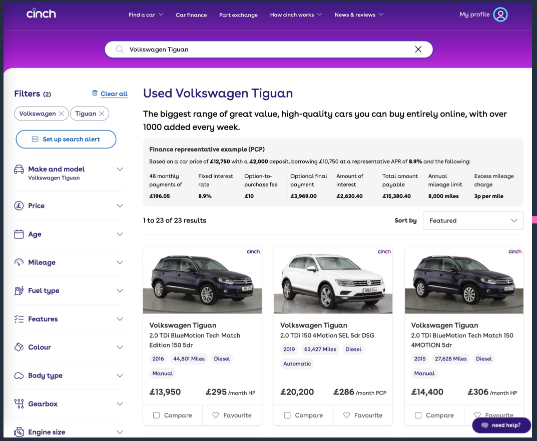
💜 Search could focus on making search awesome

Search were able to make filters awesome


Buying a car online – just cinch it.

Buy, finance and part exchange. Free home delivery or collection. 14-day money-back guarantee.

Search



Used Volkswagen Tiguan

The biggest range of great value, high-quality cars you can buy entirely online, with over 1000 added every week.

Finance representative example (PCP)

Based on a car price of **£12,750** with a **£2,000** deposit, borrowing £10,750 at a representative APR of **8.9%** and the following:

48 monthly payments of	Fixed interest rate	Option-to-purchase fee	Optional final payment	Amount of interest	Total amount payable	Annual mileage limit	Excess mileage charge
£196.05	**8.9%**	**£10**	**£3,969.00**	**£2,630.40**	**£15,380.40**	**8,000 miles**	**3p per mile**

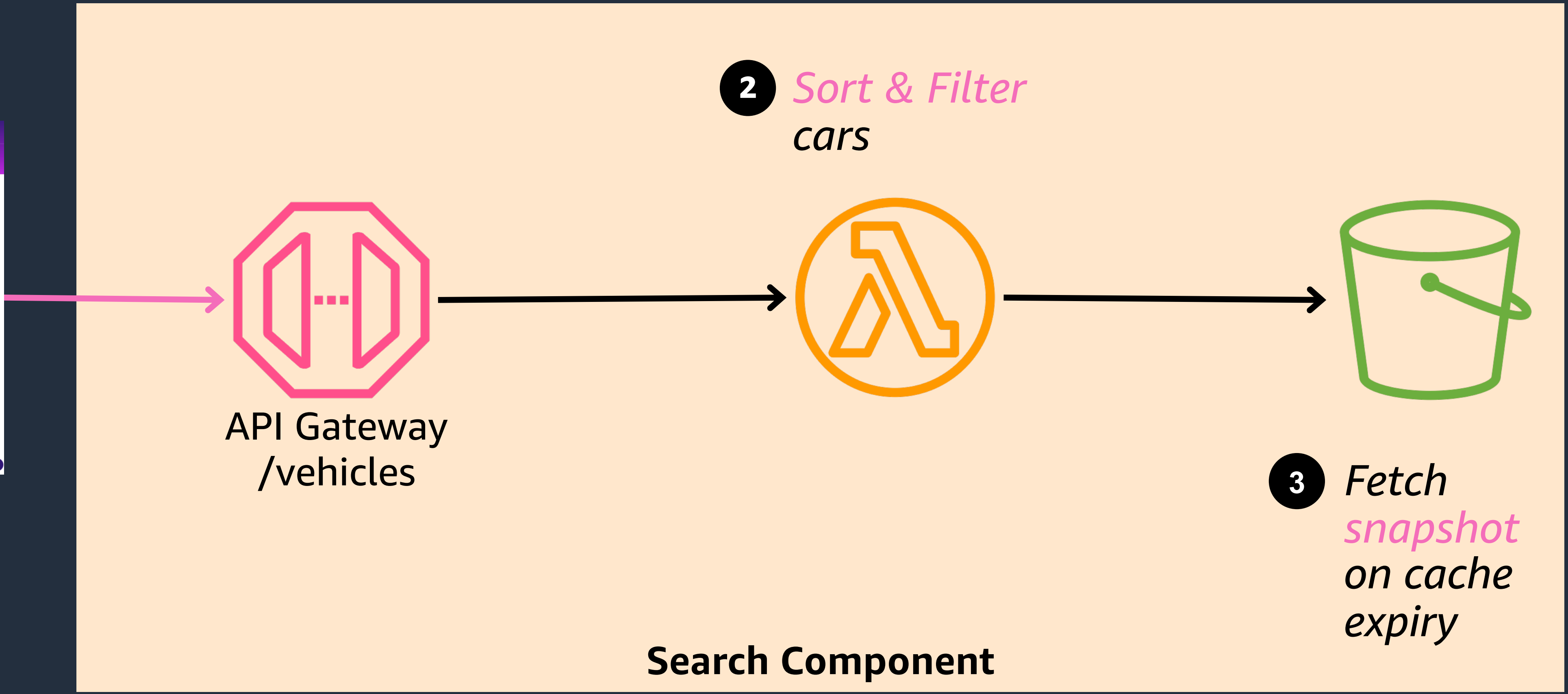
1 to 23 of 23 results

Volkswagen Tiguan
2.0 TDi BlueMotion Tech Match Edition 150 5dr
2016 · 44,801 Miles · Diesel · Manual
£13,950 £295 /month HP
Compare · Favourite

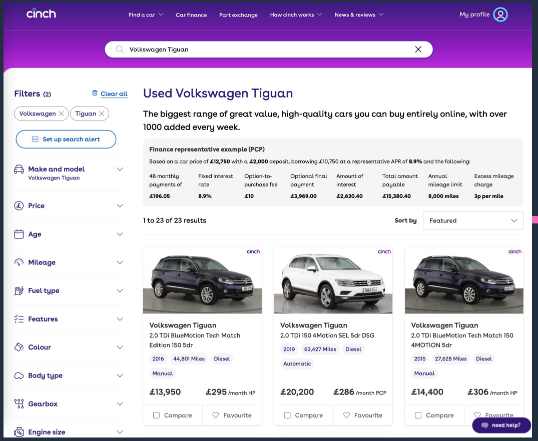
Volkswagen Tiguan
2.0 TDi 150 4Motion SEL 5dr DSG
2019 · 63,427 Miles · Diesel · Automatic
£20,200 £286 /month PCP
Compare · Favourite

Volkswagen Tiguan
2.0 TDi BlueMotion Tech Match 150 4MOTION 5dr
2015 · 27,628 Miles · Diesel · Manual
£14,400 £306 /month HP
Compare · Favourite

1 User searches cars



Search



Filters (2) Clear all

Volkswagen × Tiguan ×

Set up search alert

Make and model
Volkswagen Tiguan

Price

Age

Mileage

Fuel type

Features

Colour

Body type

Gearbox

Engine size

Used Volkswagen Tiguan

The biggest range of great value, high-quality cars you can buy entirely online, with over 1000 added every week.

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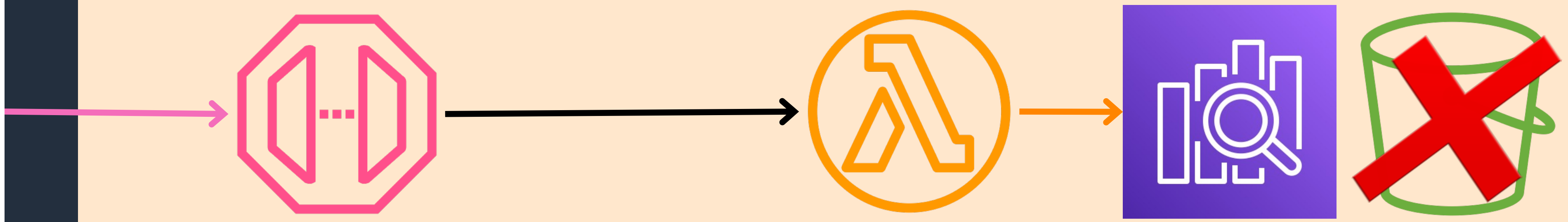
1 to 23 of 23 results

Sort by Featured

Volkswagen Tiguan	Volkswagen Tiguan	Volkswagen Tiguan
2.0 TDi BlueMotion Tech Match Edition 150 5dr	2.0 TDi 150 4Motion SEL 5dr DSG	2.0 TDi BlueMotion Tech Match 150 4MOTION 5dr
2016 · 44,801 Miles · Diesel · Manual	2019 · 63,427 Miles · Diesel · Automatic	2015 · 27,628 Miles · Diesel · Manual
£13,950 · £295 /month HP	£20,200 · £286 /month PCP	£14,400 · £306 /month HP
Compare · Favourite	Compare · Favourite	Compare · Favourite

1 User *searches* cars



API Gateway
/vehicles

2 *Sort & Filter cars*

3 *Fetch data from Amazon OpenSearch*

Search Component

Conclusion

🏃 We chose serverless EDA and ran with it

💪 We evolved our systems with little friction

🏎️ EDA (+ serverless) enabled teams to be autonomous and move at pace

🤗 We built an eventually consistent decoupled system to protect our customers

💜 Domain events are our protagonists

✍️ We only need an interface contract

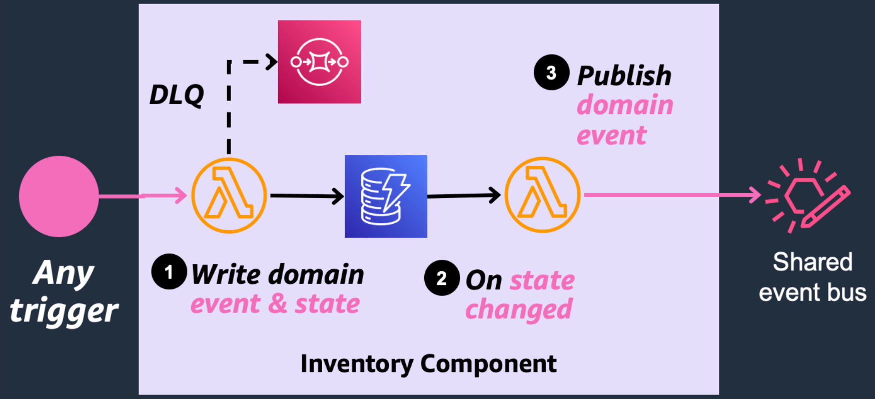
Serverless Event Driven systems…

Scale without having to manage much

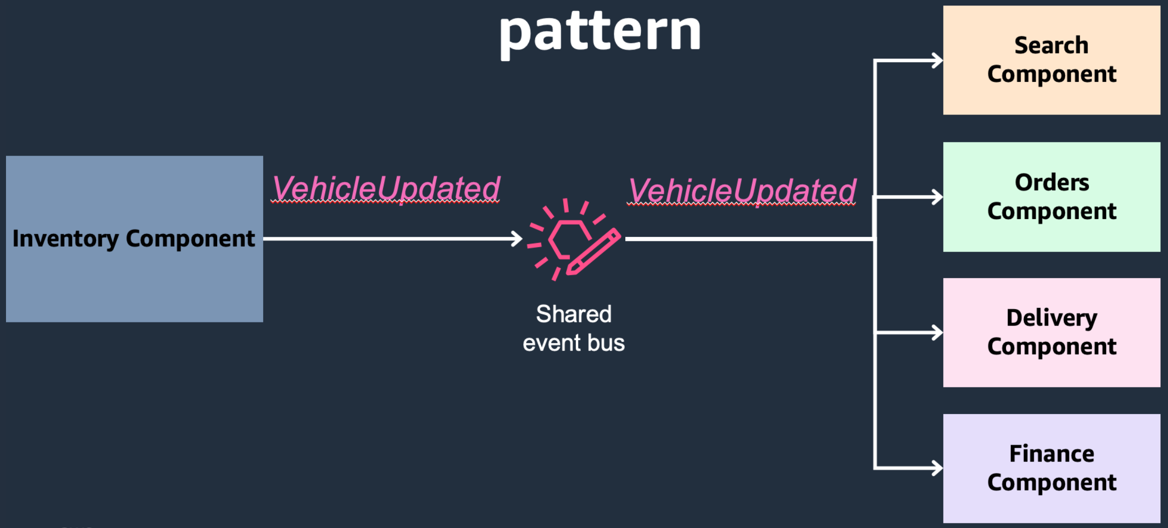
Are quicker the more it gets used

Cost less than containerized solutions

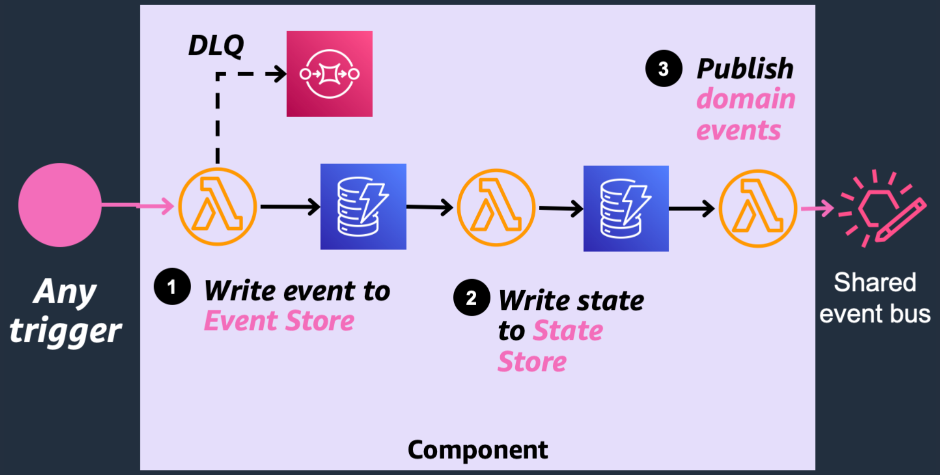
Event ledger pattern



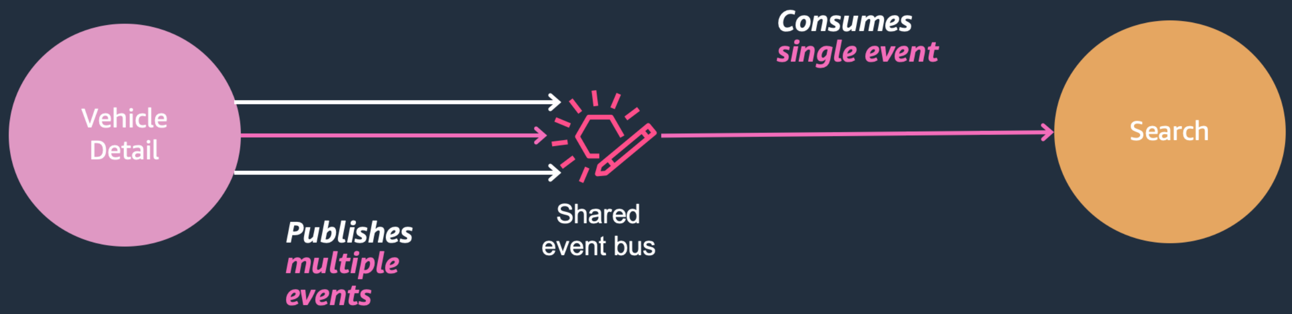
The God event pattern



Event/State Store pattern



Lazy consumer pattern



Event ledger
pattern

⬇

Separate stores

The God event
pattern

Event/State Store
pattern

Lazy Consumer
pattern

Event ledger
pattern

⬇

Separate stores

The God event
pattern

⬇

Smaller events

Event/State Store
pattern

Lazy Consumer
pattern

Event ledger pattern

⬇

Separate stores

The God event pattern

⬇

Smaller events

Event/State Store pattern

⬇

Use DynamoDB change streams

Lazy Consumer pattern

Event ledger
pattern

⬇

Separate stores

The God event
pattern

⬇

Smaller events

Event/State Store
pattern

⬇

Use DynamoDB
change streams

Lazy Consumer
pattern

⬇

Be intentional
with tradeoffs

Events are simple, declarative

Events are a data transfer mechanism

👍

System is extensible

Teams like it

It doesn’t matter.

Event-Driven, Serverless systems allow you to experiment and evolve.

You can make mistakes and recover from them.

Think in events, be deliberate about their design.

Throw it away and start again.

Thank you!

goto;

GOTO
Guide

Download on the App Store

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Let us help you

Ask questions through **the app**

★★★★★

remember to rate the session

THANK YOU

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THANK YOU