

# AWS re:Invent

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AUT201

# Digital customer engagement for automotive

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Rivian



# Agenda

AWS digital customer engagement for automotive

Adventuring with Rivian – Going from 0 to 100 using Amazon Connect

Moving toward customer centricity using AI at BMW

# AWS automotive



AWS is making it easier for customers to innovate, modernize, and scale automotive solutions by offering:

1. The most comprehensive set of **purpose-built automotive services and solutions**
2. Unmatched **industry experience** and expertise
3. The **broadest partner ecosystem** of any cloud to help automotive customers digitally transform their business

Amazon's culture of **innovation combined** with **AWS for automotive investments** and **delivery capability** offers a **differentiated opportunity** for AWS to guide customers to build, partner, or buy in their preferred way – wherever they are in their journey

# AWS for automotive (8) strategic workloads



## Product engineering

Customers can use AWS and partner-enabled solutions to develop new and innovative products at a faster pace by collaborating with multiple suppliers and OEMs across a single platform



## Autonomous vehicle development

Amazon's 20 years of experience with autonomous systems, robotics, and machine learning taught us how to accelerate our customers' AV development with purpose-built AWS solutions



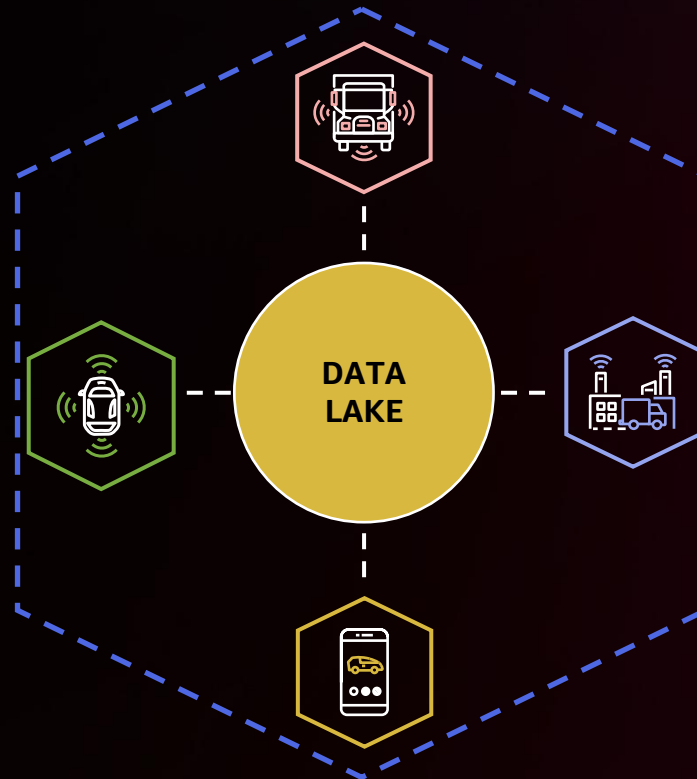
## Supply chain

Gain end-to-end real-time visibility and insights beyond immediate suppliers to build a resilient, intelligent and cost-effective supply chain with unprecedented efficiency



## Manufacturing

Realize improved manufacturing operations and overall equipment effectiveness by enabling data-driven real-time decisions leveraging existing shop floor data and innovative technologies



## Digital customer engagement

Increase customer engagement with relevant marketing content, personalized digital experiences, and real-time data analysis



## Software-defined vehicle

The vehicle is evolving into a software-defined digital platform and empowering the design and development teams to deliver on changing consumer value expectations



## Connected mobility

In a software-driven era, technology unlocks the power of your data to build intelligent, personalized features and revenue-generating mobility services



## Sustainability and EV

The evolution of electrification will require enablement tools for battery asset monitoring, track and trace capabilities, and sustainability reporting. Microservice solutions, EV infrastructure, and location-based services are focus areas.

# Digital customer engagement

Empower top automotive brands to be relevant with every customer interaction for a lifetime of value

## Experience

Build an end-to-end customer experience journey from mobile to the showroom/studio to develop new and relevant customer touchpoints for the brand

## Data and insights

Leverage customer insights to increase “always-on” brand interaction through personalized and engaging digital experiences

## Decisions

Manage data on a massive scale with low latency to better understand, engage, and acquire customers using ML and AI to scale



Transforming the digital customer experience to improve customer acquisition, retention, and loyalty

# Adventuring with Rivian

## Going from 0 to 100 using Amazon Connect

Alejandro Martinez

Software Engineer II  
Rivian

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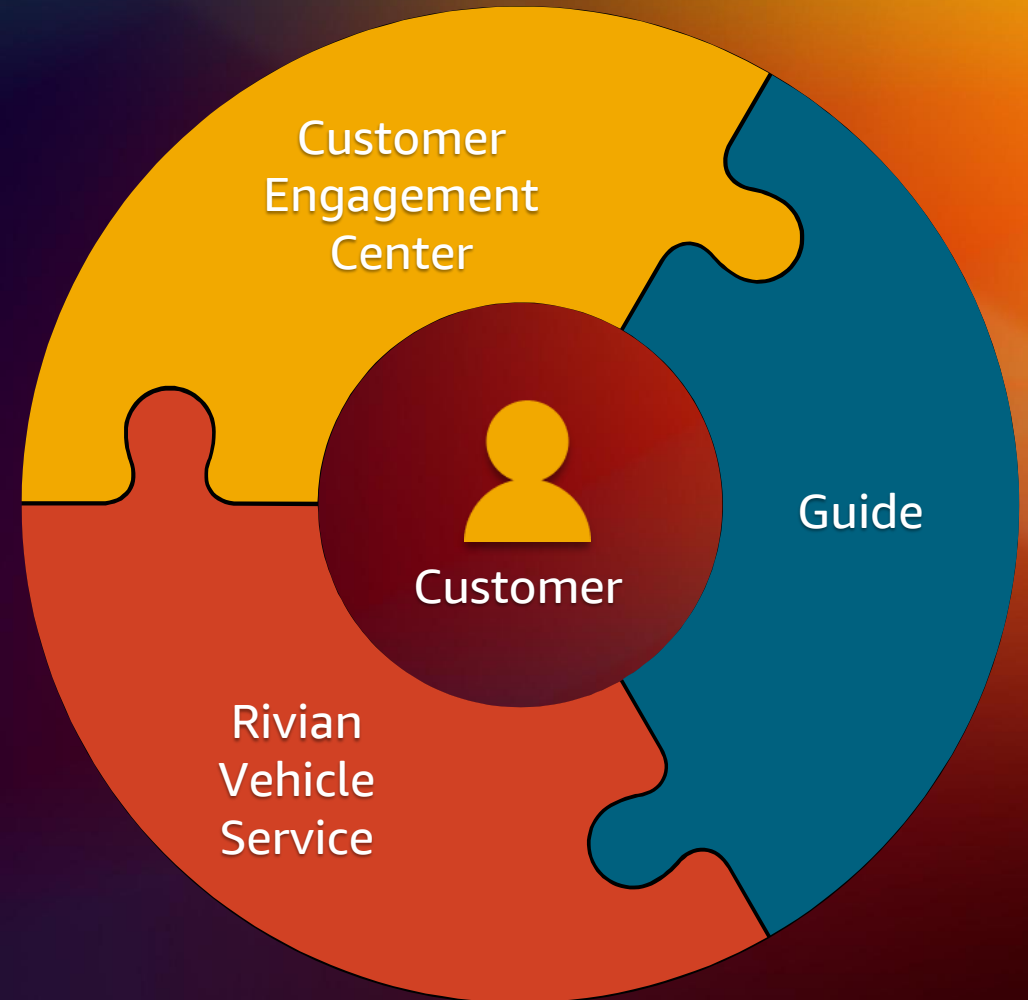
Senior Software Engineer  
Rivian





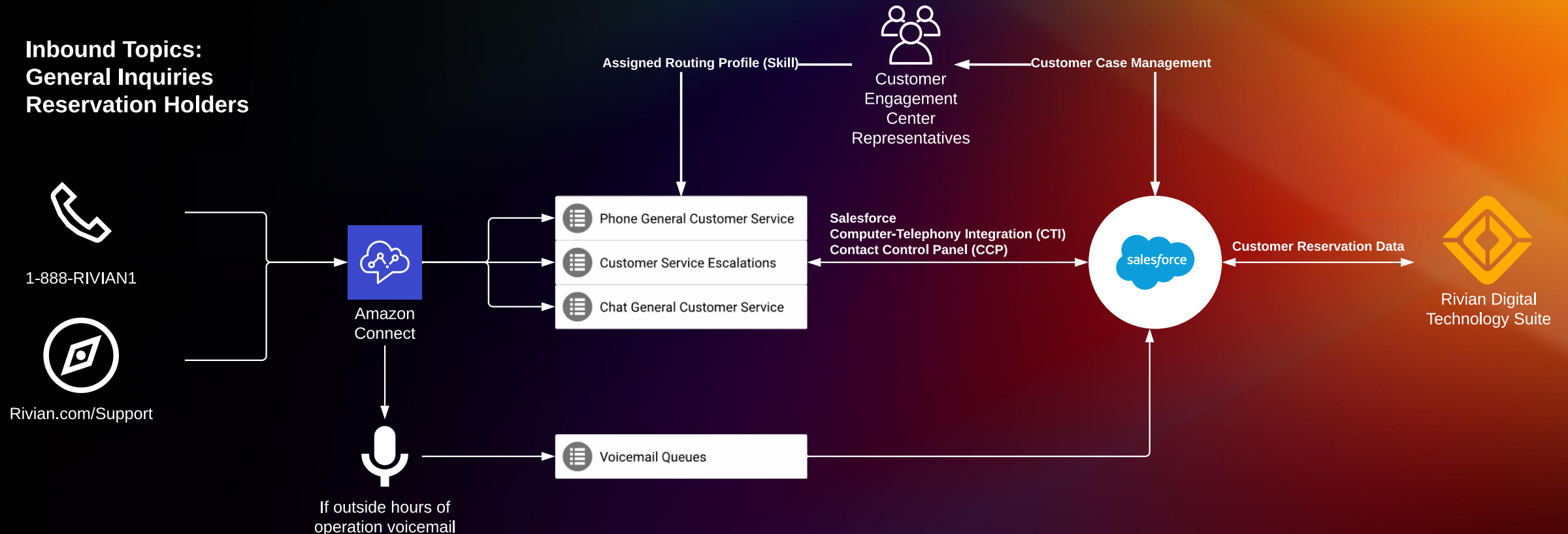
# Rivian's Vision Around the Customer's Journey

"Keep  
the world  
adventurous  
forever."

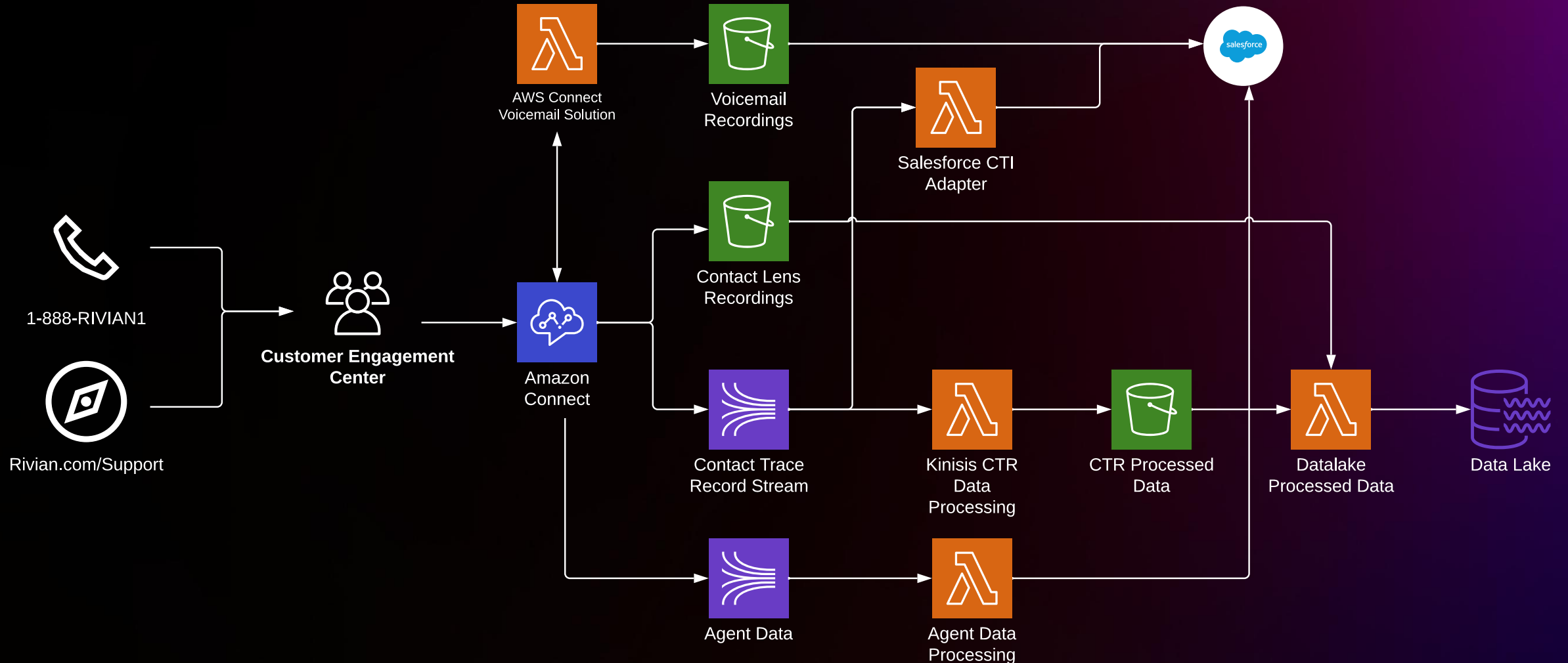


# Functional architecture at the starting line (at zero)

Inbound Topics:  
General Inquiries  
Reservation Holders



# Architecture at the starting line (at zero)

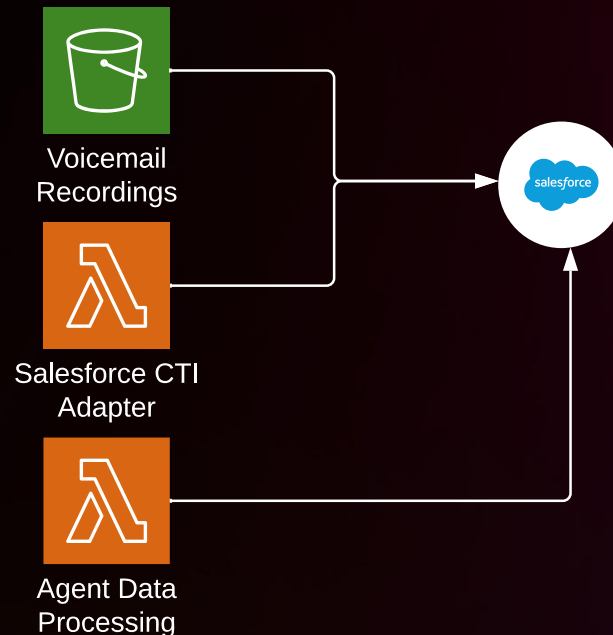


# Rivian's Vision Around the Customer's Journey

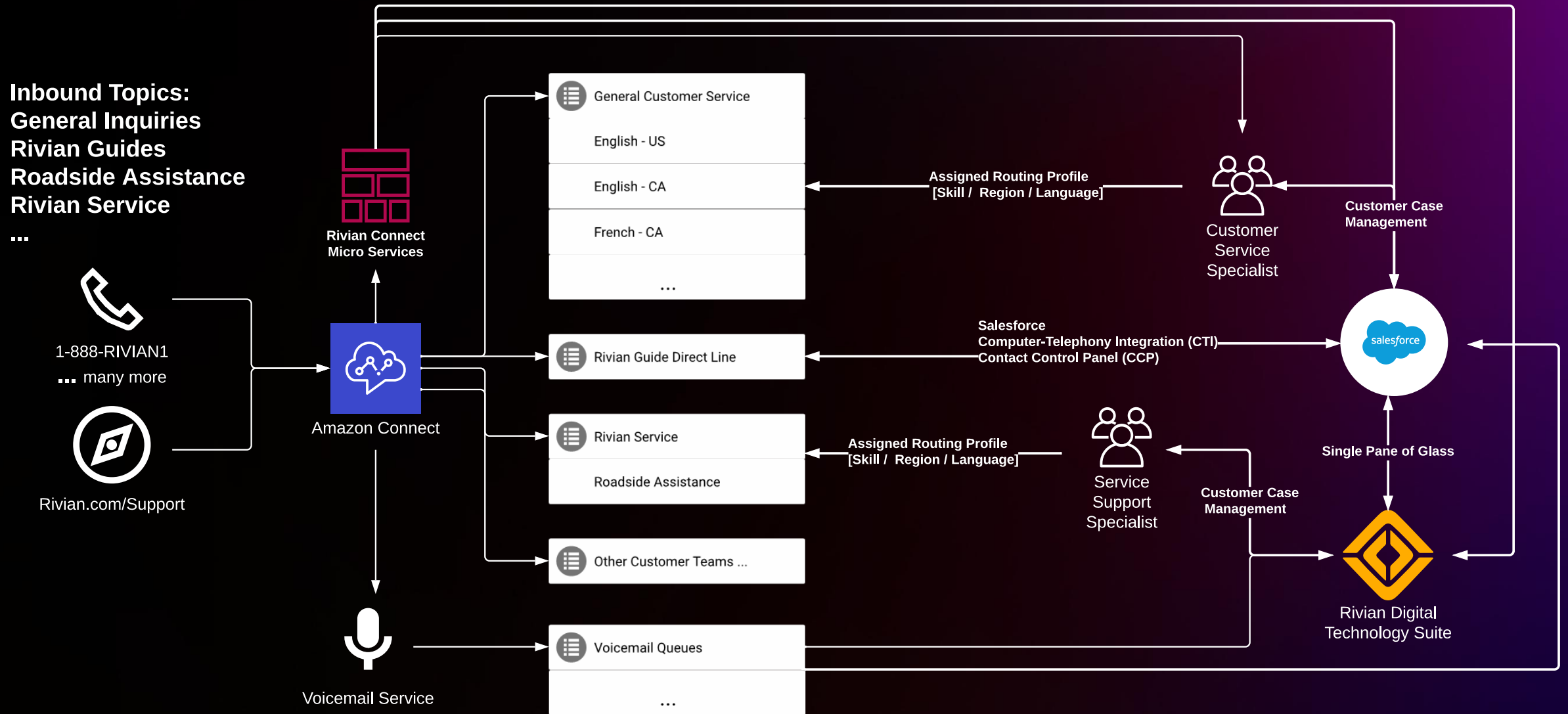


## Customer Engagement Center

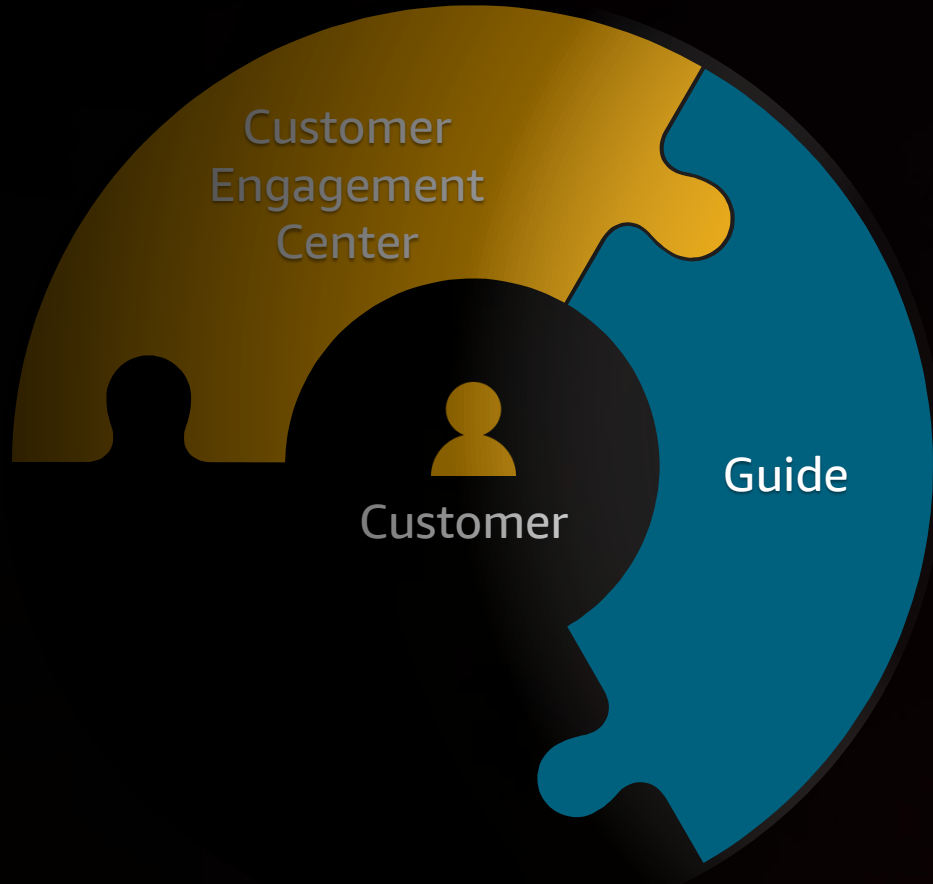
- Lead Generation, Acquisition, and Conversion
- Well-equipped agents with product and domain expertise



# Functional Architecture at 100

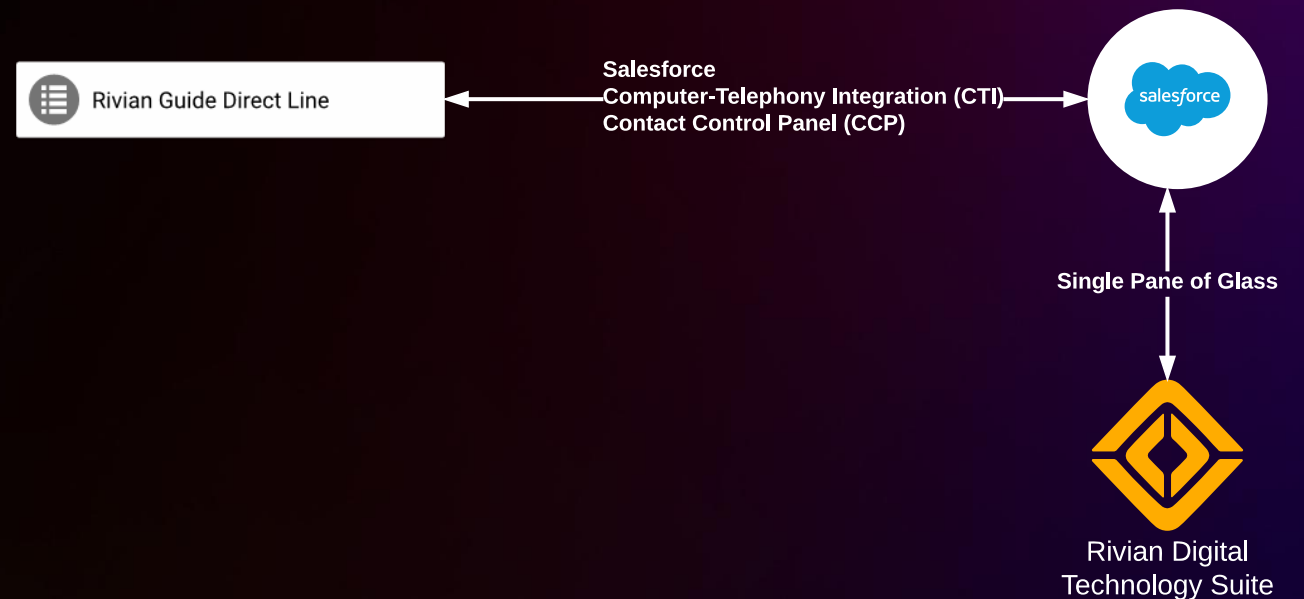


# Rivian's Vision Around the Customer's Journey

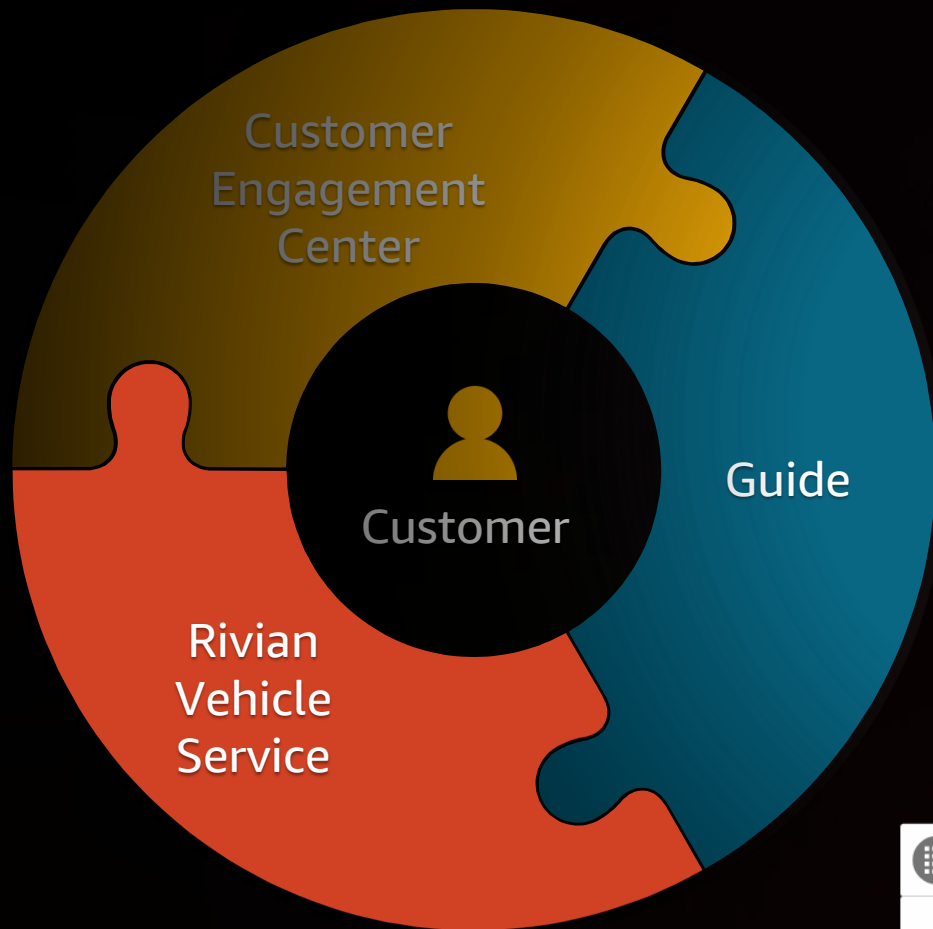


## Guide

- Tailored Rivian concierge experience
- Builds **rapport** and trust on a personal level
- Creating a single pane of glass for customer interactions across teams

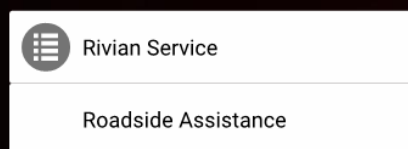


# Rivian's Vision Around the Customer's Journey



## Rivian Vehicle Service

- Customer friendly communication channels available 24/7 – 365 days a year
- Integrated support network
  - Seamless integrations with external parties and tools (ie. Towing services and collision centers)
  - Location based vehicle support for customer convenience
- Specialized channel experts with flexible priority assignment



Assigned Routing Profile  
[Skill / Region / Language]



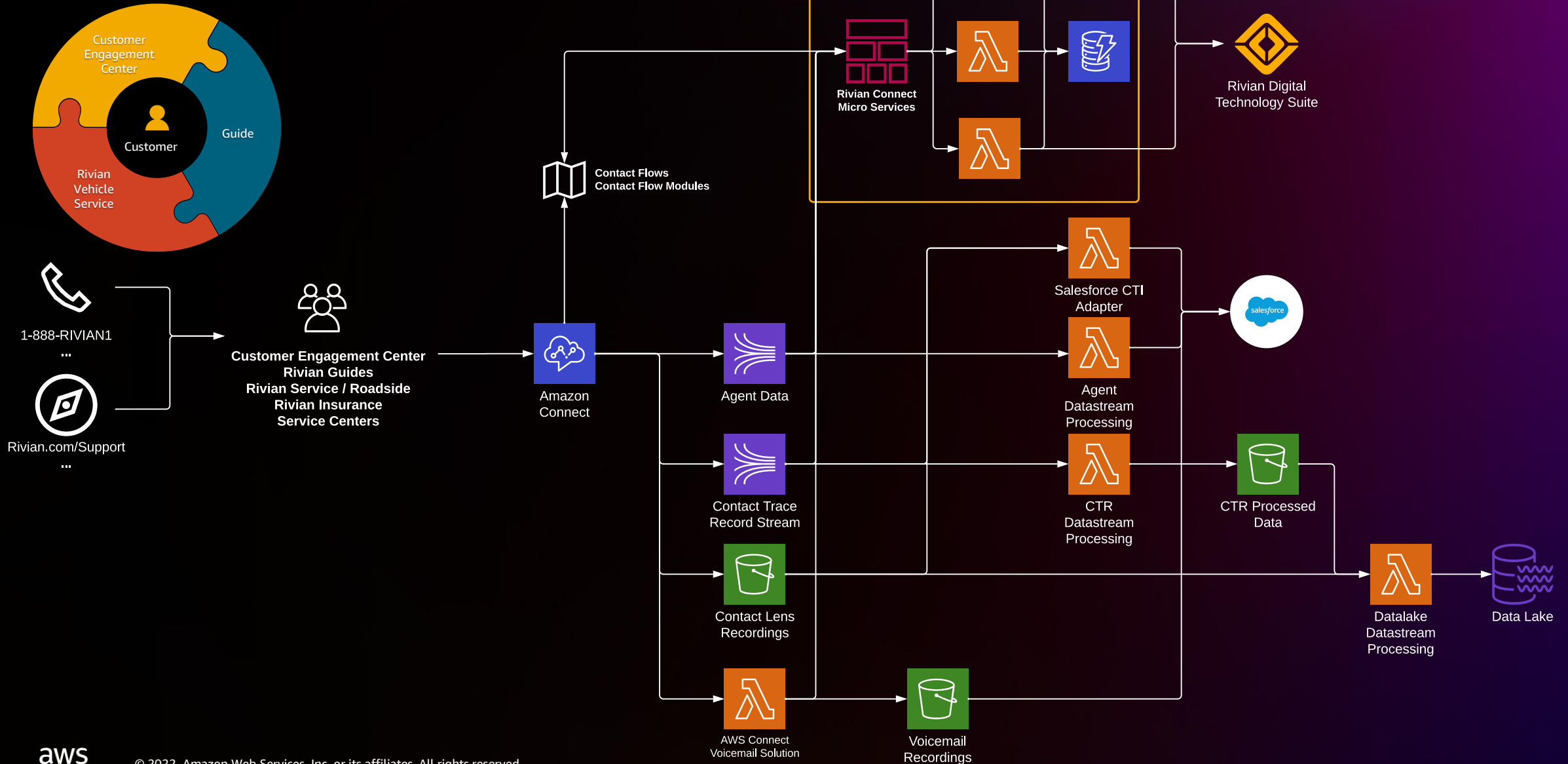
Service Support Specialist

Customer Case Management



Rivian Digital Technology Suite

# Architecture at 100



# Path Towards Automation

## Purpose

Bring Rivian's various teams online as fast as possible, without comprising on quality

## How?

Rapidly scale by lowering engineering overhead in onboarding and contributing to our ever-growing Amazon Connect solution



# Path Towards Automation

## Management of Inbound and Outbound Channels

- Utilized Amazon Connect APIs and integrated with Cloud Formation to align with our organization goal of infrastructure as code
- Created template fueled scripts to streamline our business requirements into code
  - For example, custom scripting to automate the account provisioning process and phone number procurement



# Path Towards Automation

## Cloud Formation

- Automation through serverless deployments
- Built release pipelines to promote through our development to production environments
- Code MRs minimize scope collision with multiple developers
- Simplifies multiple previously manual configurations across AWS services
- Saves time and reduces errors when promoting our AWS services



# Lessons Learned

- We can maximize uptime:
  - Automating our configurations and infrastructure
  - We're continuing a journey with AWS to move closer to an infrastructure as code architecture
- We can utilize data to better understand:
  - Our customer's frustrations and sentiment towards their experience
  - Staffing requirements across teams

# Value to Rivian and our Customers

## Rivian

Utilization of Connect APIs to create automated tools to run the business



## Our Customers

Increased uptime and ability to horizontally scale quickly

Built in dexterity and flexibility to address the unique needs of each of our teams



High touch experience that connects customers to topic experts to best address their needs

Component based architecture allowing for reusability across Rivian teams (Rivian Vehicle Services, Finance & Insurance, Fleet, etc.)



Consistency in quality of experience throughout our customer's journey

# Moving toward customer centricity using AI at BMW Group

Stefan Meinzer

General Manager Corporate  
Performance Management &  
Advanced Analytics Sales  
BMW Group

Andrej Levin

Managing Director and Partner/  
Global Lead for AI in Automotive  
Boston Consulting Group

Rafael Veloso

Chief Technical Titan - Data  
Products  
Critical TechWorks

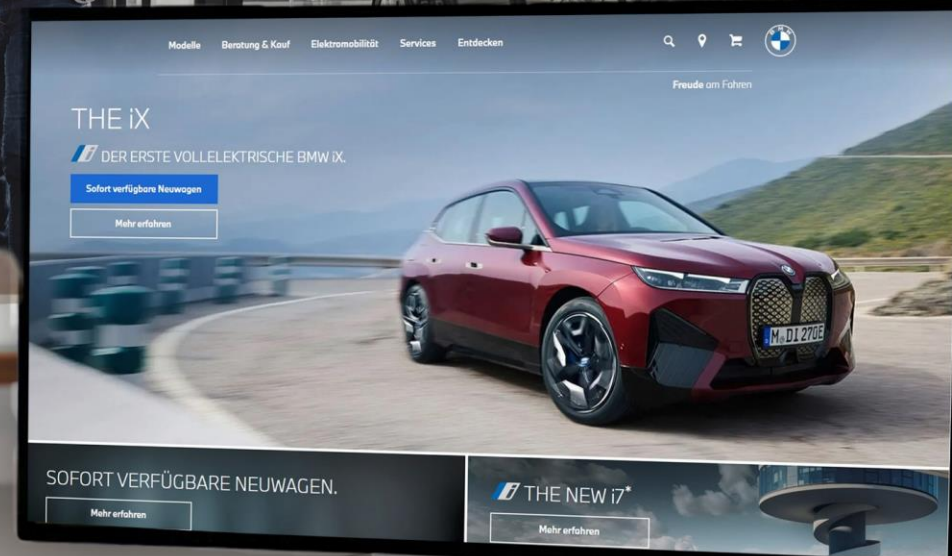


# Customer Centricity: What this means at BMW Group

CUSTOMER-FOCUSED CLOUD DATA PLATFORM

DATA-DRIVEN PERFORMANCE MANAGEMENT

DEMAND-DRIVEN SALES AND STOCK  
MANAGEMENT



# Customer Centricity: What this means at BMW Group

Dealership  
visits

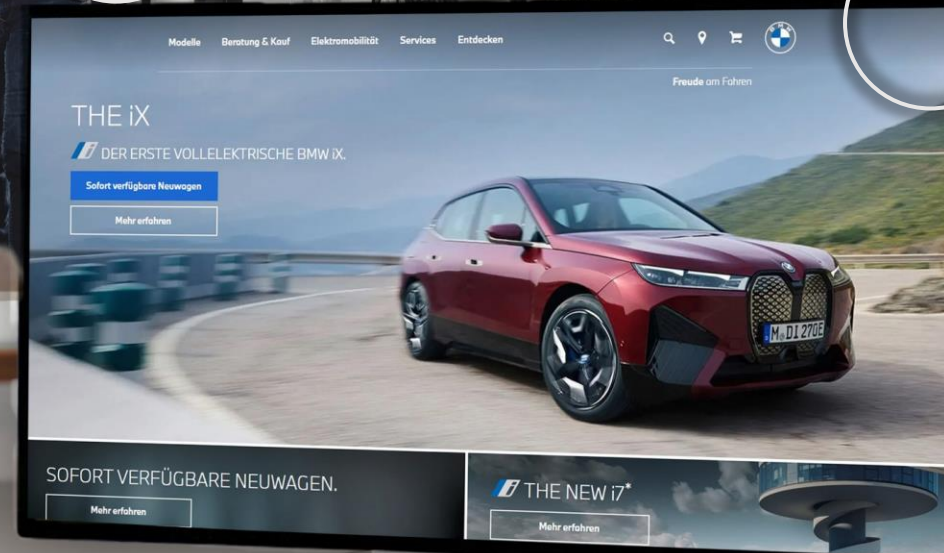
BMW Group App  
interactions

Website &  
configurator visits

CUSTOMER-FOCUSED CLOUD DATA PLATFORM

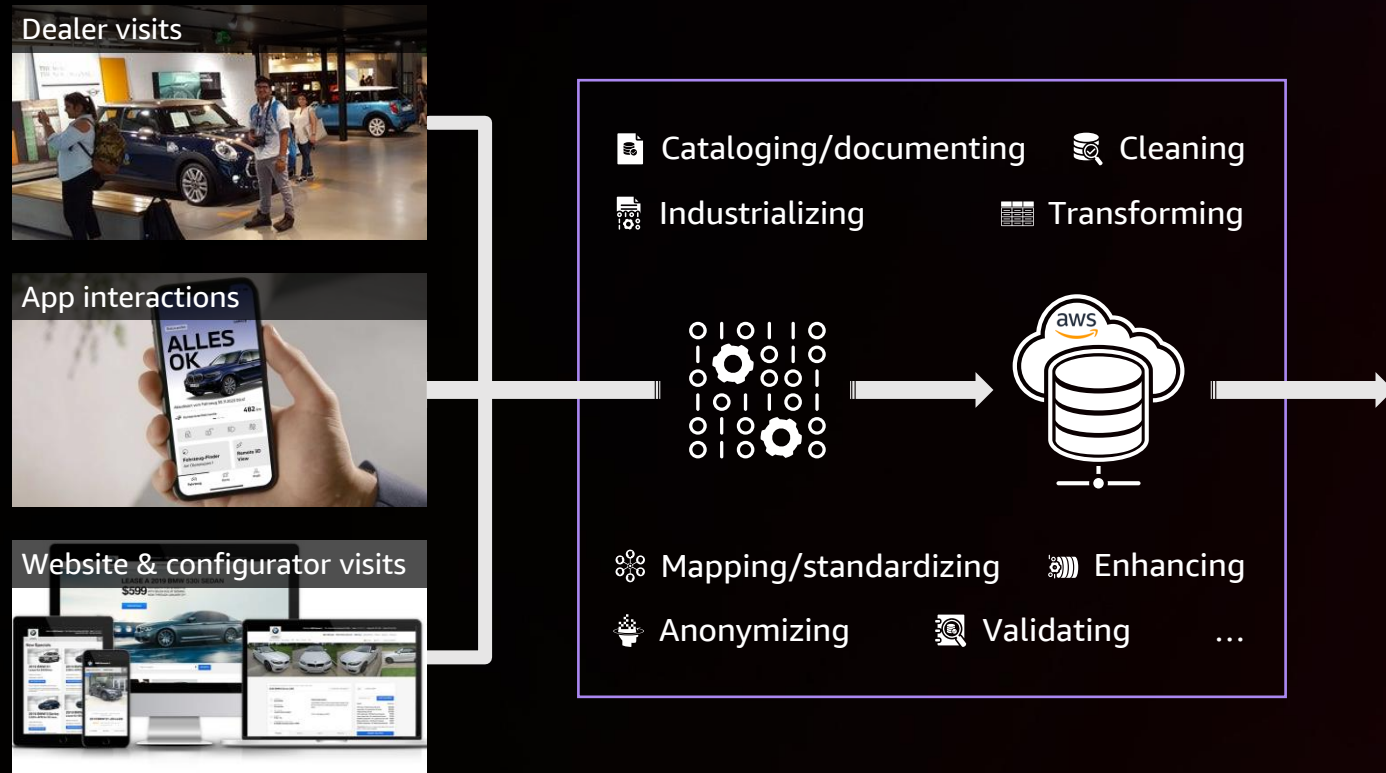
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DEMAND-DRIVEN SALES AND STOCK  
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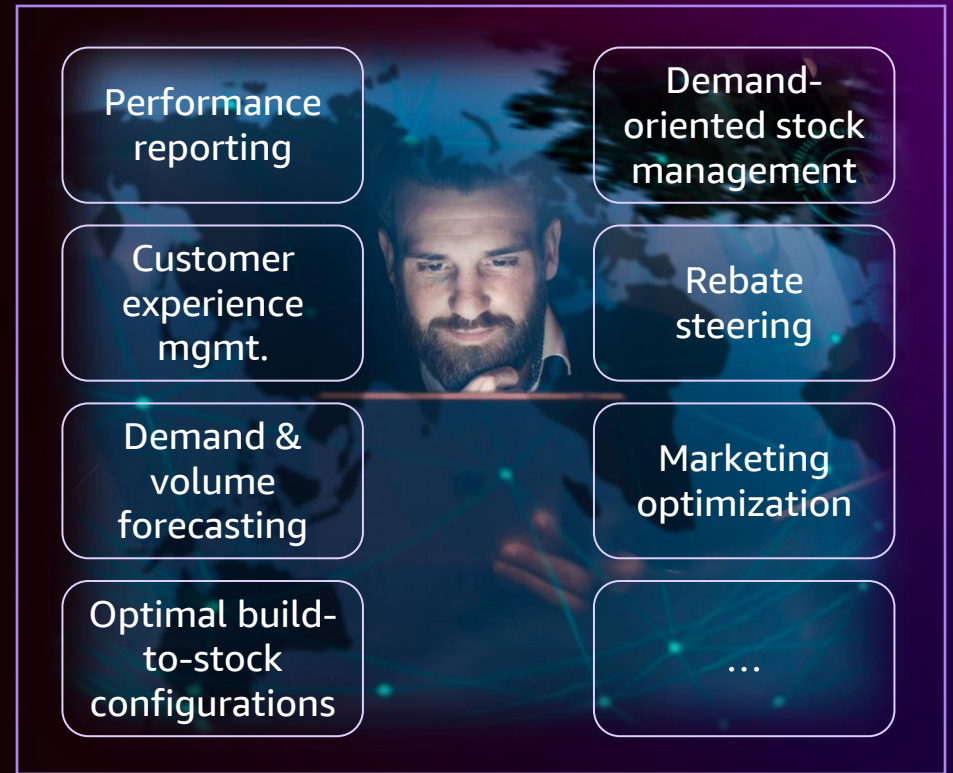


# Customer Centricity at BMW Group from a data perspective.

Collecting data and building data assets ...



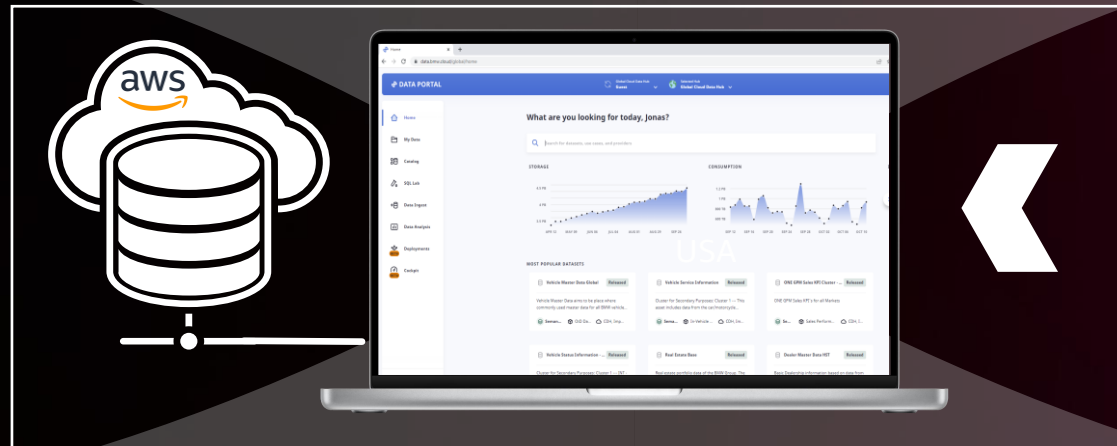
... to enable analytics cases that enhance the customer experience



# One unified framework drives cloud platform



Cloud data platform provides data for **30+** markets from **250+** local systems



**One unified cloud data & analytics framework (CDAF)**

- All-inclusive package
- Implemented in AWS

Supporting all our customer centricity use cases initiatives

Performance Reporting

Stock management

Customer experience

Rebate steering

Demand forecasting

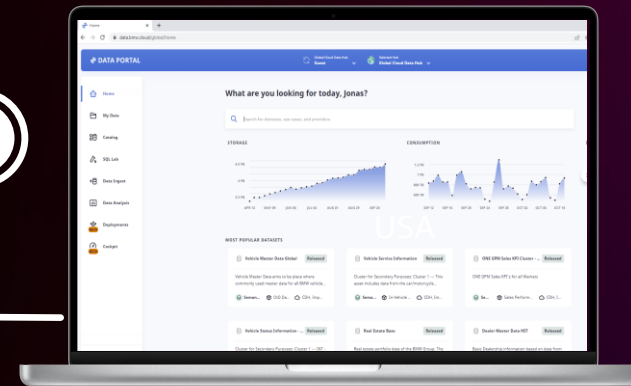
Sales volume forecasting

Marketing optimization

...



# One unified framework drives cloud platform



# Example: Configuration over implementation ...

8 lines of Python code to deploy a data pipeline (on-prem to S3)

## Resources generated

- **KMS key and alias**
- **S3 bucket and object**
- **AWS Identity and Access Management (IAM) roles and all necessary policies**  
(as granular as it can get)
- **Glue security configuration**
- **Glue connection**
- **Glue jobs**
- **SNS topics**
- ...

Results in **hundreds** of Terraform code lines and **hundreds** of resources in AWS

```
JDBCSource(  
    name="source-a",  
    subnet_ids=["subnet-05df87f5ed867ccf1"],  
    security_groups=["sg-010a910cdc3b117fb"],  
    jdbc_connection_url="jdbc:mysql://localhost:3306/mysql",  
    database_name="database-a",  
    Table_names=["table-a", "table-b"],  
)
```

# ... enabling development & deployment flow ...

Illustrative high-level architecture

## Branching system

- Development on the next version

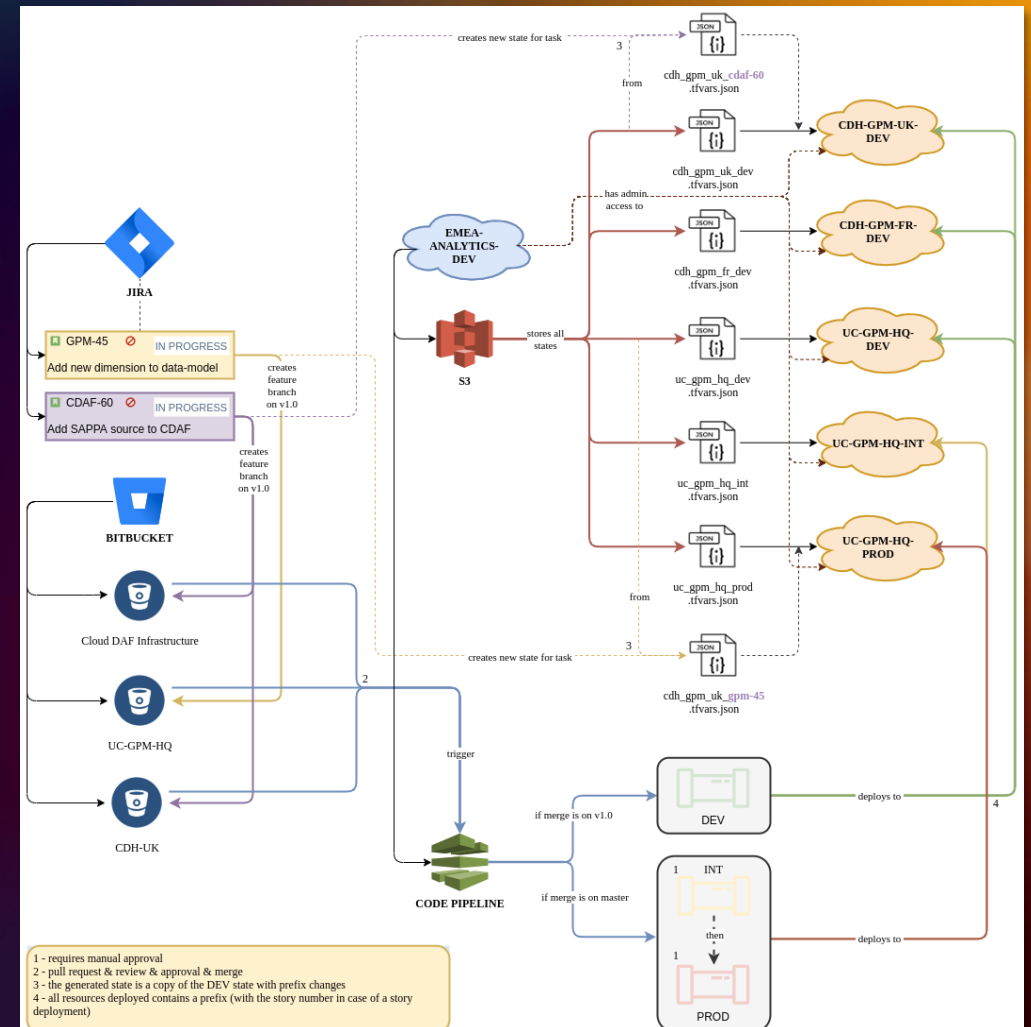
## Sandbox environment for development

## Git Hooks and Insights

- Syntax checker
- Infrastructure checks
- Tests

## CI/CD

- Adapted to versioning and branching systems



# ... with full set of relevant features & modules

## FEATURES

Logging and Error handling

Debugging

BMW Group Data Portal  
Integration

**Sandbox and Versioning**

**Data Migration**

**Configuration Based**

**AWS Resources Cleanup**

## MODULES

### Stacks

- Provider
- Consumer

### Libraries

- Scalable Anonymization
- Advanced Depersonalization
- AWS utils
- Glue/Spark Reader
- Data Transformation Helpers

### Modules

- Security reporter
- Orchestrator
- Data Modeling
- Dynamic triggering
- Data Quality with Quality Gateway
- Generic Incremental Module (GIM)
- Monitoring
  - Alerting
  - Notifications
  - Dashboard

# Customer Centricity: What this means at BMW Group

CUSTOMER-FOCUSED CLOUD DATA PLATFORM

DATA-DRIVEN PERFORMANCE MANAGEMENT

DEMAND-DRIVEN SALES AND STOCK  
MANAGEMENT



# Motivation: Data and reporting challenges prevented customer-centric steering

## Steering challenges across markets for BMW Group board council ...



Manual performance tracking



## ... prohibiting data-driven customer centricity

No automatic, granular, up-to-date view of **customer demand** and sales performance



Lack of data governance



Lack of data quality and reliability preventing data-driven **customer understanding**



Different tech stacks/platforms



Incomplete centralized access to required data for **demand-oriented** sales steering



Inconsistent KPI definitions/tracking



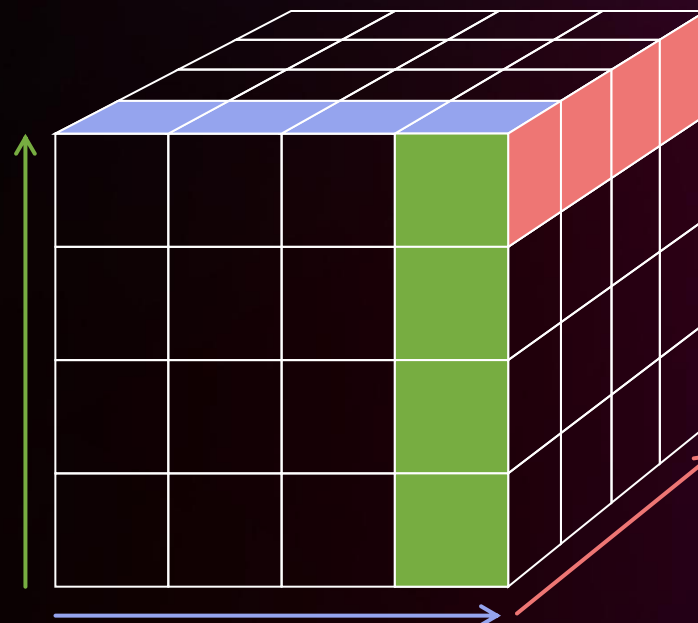
No comparability of **customer needs and preferences** across markets

# That's One Granular Performance Management!

One standardized data cube for reporting & advanced analytics

## MARKETS

Rest of World  
APAC, Africa Region  
North America  
EMEA Region



## FUNCTIONALITIES

Recommendation/AI/  
Automation  
Interactive/Predictive  
Online Reporting

## CORE KPIS

Sales	Leads
Finance	Sales Channels
Stock	Aftersales / Support
Customer Satisfaction	...

# One Granular Performance Mgmt. in numbers

**33 markets**  
live by end of 2022



Countless  
pages  
**digitalized**



**> 3,000 user**  
**of our data**  
through ONE GPM  
backend



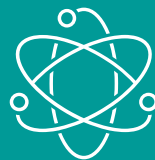
**47 Qlik**  
expert  
dashboards



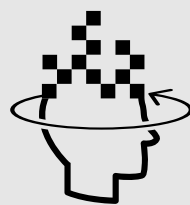
**HTML tool** for mobile,  
tablet and  
desktop



**> 30 data**  
**asset use**  
**cases**



Data driven  
**board council**  
**customer**



**ONE GPM APP**  
offers 3 report areas

Situation  
report



Market  
performance



Cockpit



**Daily**  
**updates**  
for many KPIs



**53 filter** for  
granularity  
dimensions



**+400 users**  
trained in  
central and  
market functions



**> 29 KPIs**  
**included**

**67 data**  
**sources**



49 local  
18 central

# Customer Centricity: What this means at BMW Group

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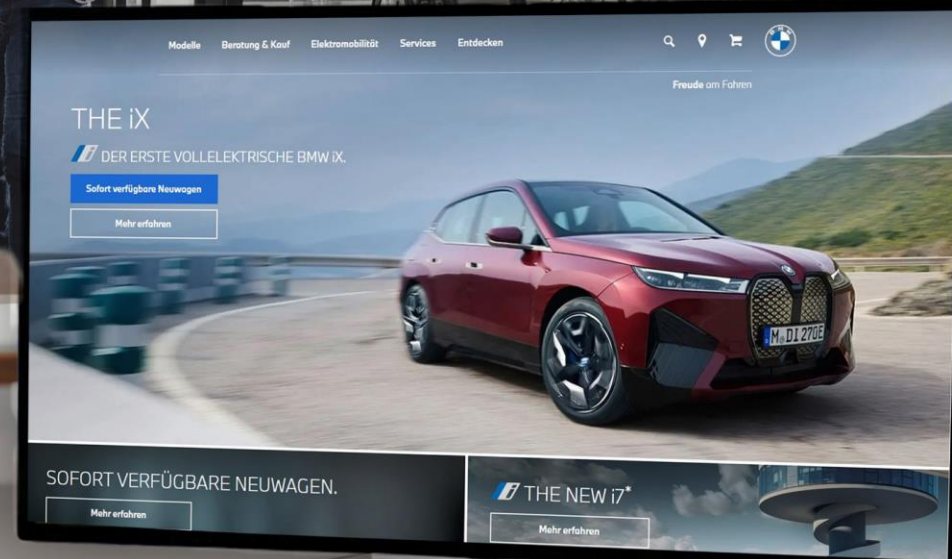
DATA-DRIVEN PERFORMANCE MANAGEMENT

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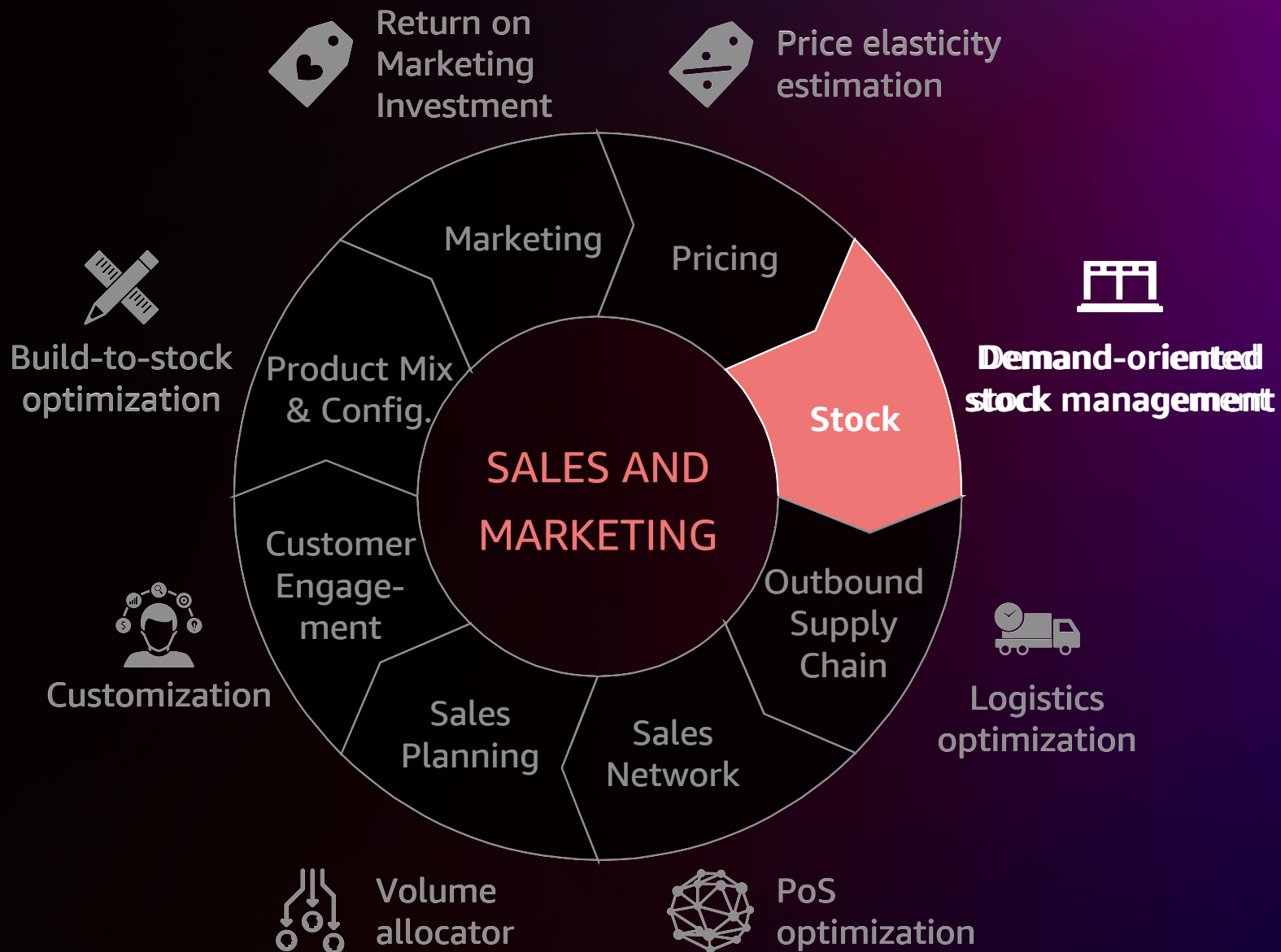
Right  
models

Right  
volume

Right  
configurations



# AI enables customer centricity across sales and marketing



# Why BMW Group needs demand-oriented stock management

## Overstocked

Net working capital  
CoR/Wholesale push  
Storage costs  
Cost of reallocation/switch



Time to delivery  
Customer satisfaction  
Lost sales  
Contribution margin loss

## Understocked

## PARADIGM SHIFT

- Data-driven and demand-oriented approach for stock steering
- Target stock depends on market environment
- Reduction of overall stock while optimizing available stock

# State-of-the-art stock insights ...



## MONITOR

How many cars are **accessible** and ready to be sold virtually?

What is the stock reach in months in case of **supply chain disruptions**?



## NAVIGATE

Which **changes to production** to avoid over-/understock?

How to deal with cars which have been **on the dealer lot** for too long?



## OPTIMIZE

Where do I need to accelerate throughput to meet DIO targets?

What is the **working capital impact** of increased process times?

# State-of-the-art stock insights ...



MONITOR

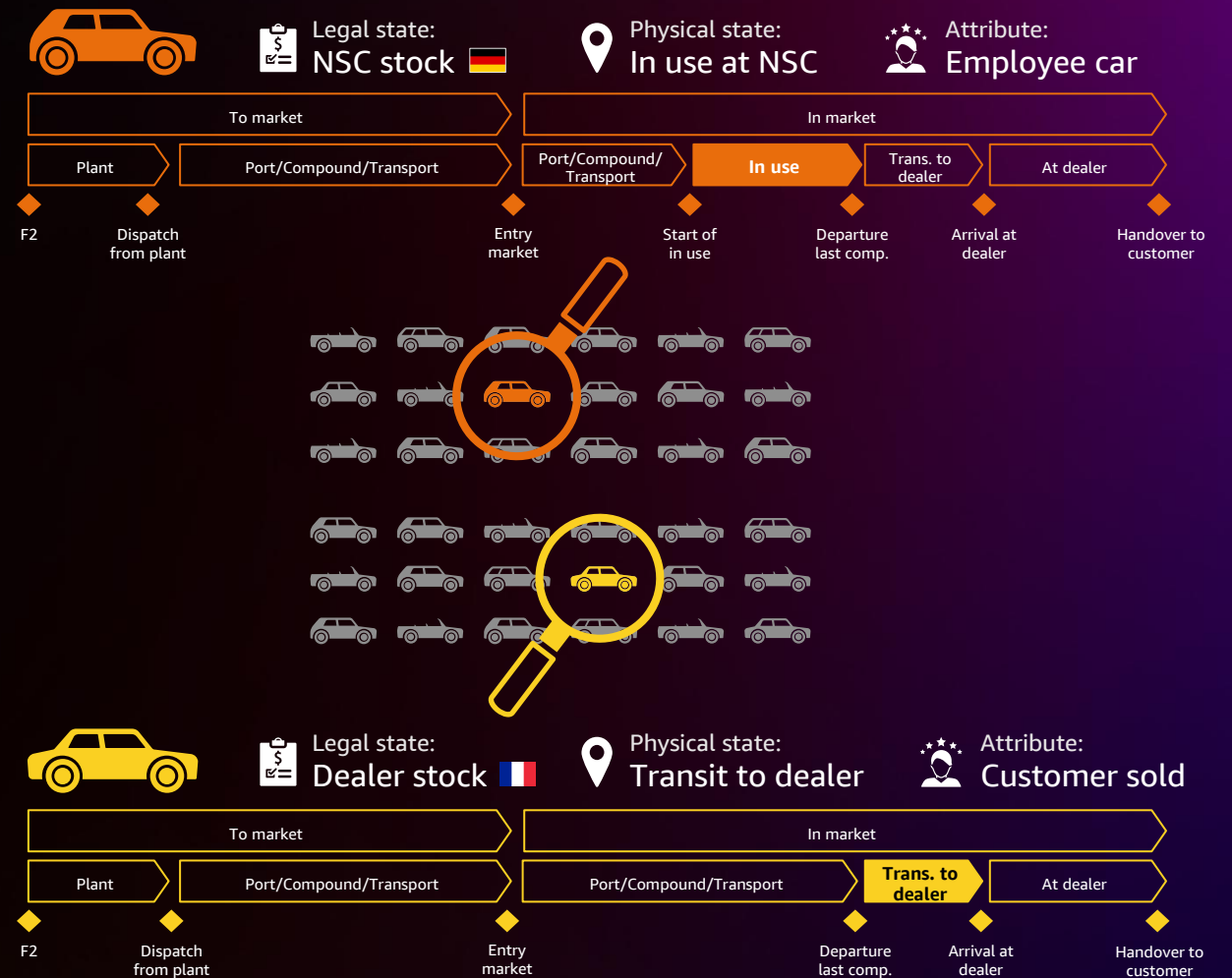


NAVIGATE



OPTIMIZE

# ... require granular data asset



# State-of-the-art stock insights ...



MONITOR



NAVIGATE



OPTIMIZE

# ... with advanced analytics



Stock Data  
Asset



Stock Level / NWC  
Optimizer



Stock Model Mix  
Optimizer

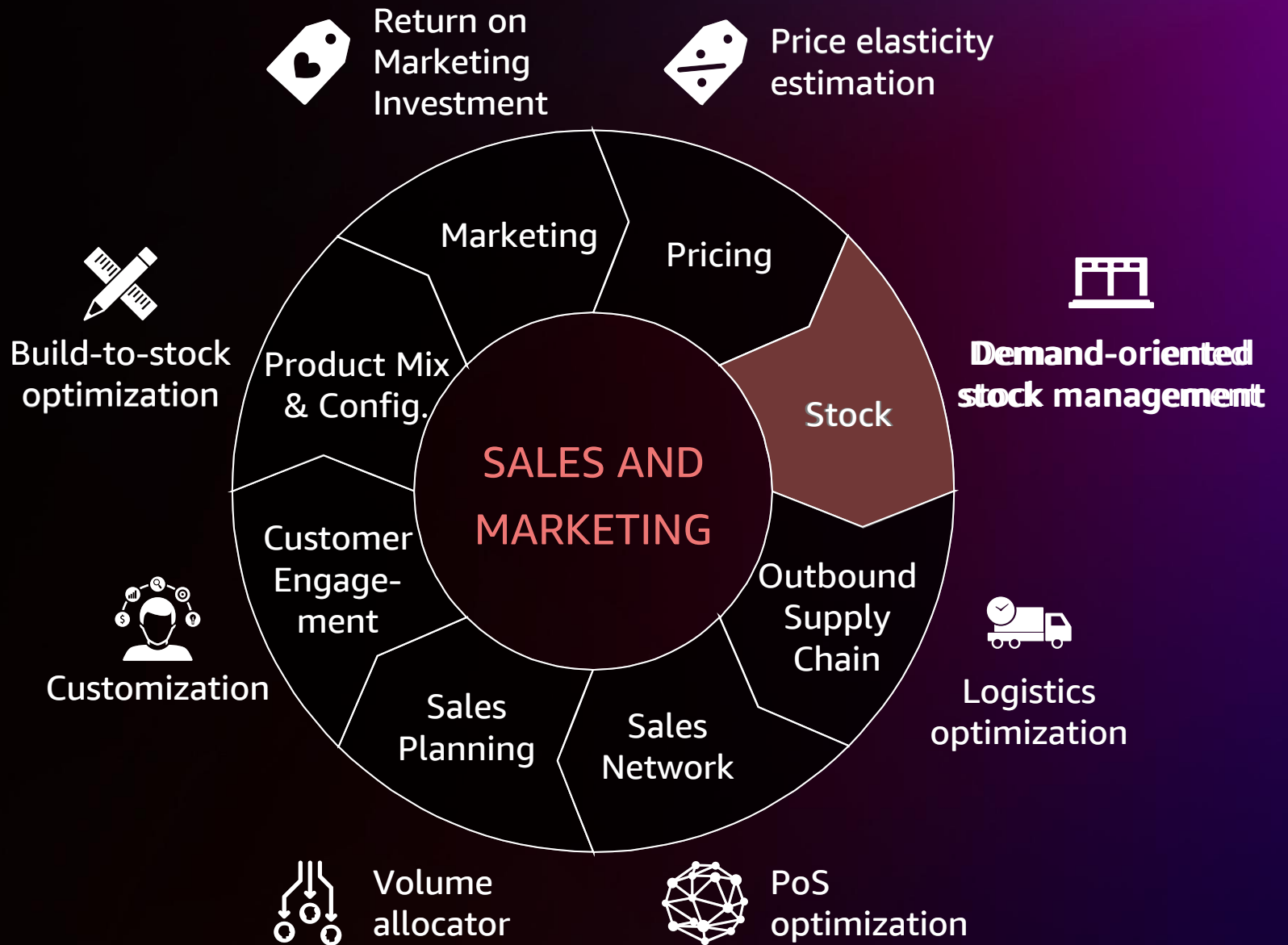


Stock Configuration  
Optimizer



Stock  
(Re-)Allocator

# Outlook: Importance of customer centric sales & marketing will only increase



# Thank you!

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