AWS re:Invent

AUT202-L

Leadership session: Automotive industry innovation in the cloud

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WW Automotive BD Lead
Amazon Web Services

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CTO
Toyota Connected

AWS re:Invent

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aws

Automotive sessions

Tuesday

12:15–1:15 PM Aria Level 3 West, Juniper 1

AUT305 – Alexa, where's my car? Test driving AWS connected vehicle solution 2.0

3:15 PM–4:15 PM Aria Level 3 West, Juniper 1

MFG204 – Volkswagen takes production to the cloud

4:45 – 5:45PM Bellagio, Grand Ballroom 5 Red

CMP328 – How Uber builds efficient & scalable autonomous vehicle simulations with AWS Batch

Wednesday

9:15–10:15 AM Aria, Level 3 West, Juniper 1

AUT306 – Creating a data-driven, cloud-native ecosystem at BMW Group

4:00 – 5:00 PM Aria, Level 1 West, Bristlecone 9 Red

AUT307 – Navigating the winding road toward driverless mobility

Agenda

Welcome and introduction

Industry transformation and the cloud

Customer imperatives

Amazon and automotive transformation

Toyota Connected Mobility Service Platform



Automotive transformation

Technology trends

Societal trends



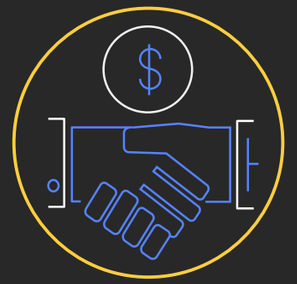




Connected



Autonomous



Shared



Electrified

Why Cloud?

Focus on your business, not undifferentiated IT management



Access virtually unlimited resources on-demand



Focus on innovation



Lower your operational costs



Empower your developers



Reduce security and compliance risk



Leverage best practices



Accelerate time to market



Increase operational agility

Why AWS?

Global scale

13+ Years as a broadly adopted cloud platform

187 Points of presence with 22 geographic Regions and 69 Availability Zones to scale connected vehicle and digital applications globally

High security

203 Security, compliance, and governance services



AWS was designed to meet stringent security requirements for risk-sensitive organizations



AWS customers retain complete ownership and control of their data and brand experience

Relentless innovation

165 Services to support automotive workloads, such as machine learning (ML), IoT, and edge computing

1,957 New features added in 2018

200+ AI/ML features and capabilities, with 10,000+ customers using AWS machine learning to reimagine customer experiences

Auto industry expertise

100% Top 10 global OEMs *AND* Tier I suppliers use AWS for meaningful connected, autonomous, or customer engagement workloads

23+ Years, on average, AWS Automotive team leaders have been in the industry

"Most mature, enterprise-ready provider, with the strongest track record of customer success & the most useful partner ecosystem"
(Gartner, 2019)

*Gartner, 2019, Top 10 based OEMs based on volume, Top 10 Tier I based on Automotive News 9/19

1M+ Customers, $33B run rate, 40% YoY growth

Automotive CxO challenges

Industry transformation driven by **C.A.S.E.**

Product innovation



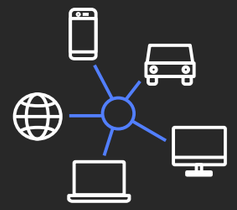
Develop differentiated products faster to meet customer expectations

Connected vehicles and mobility



Generate revenue from connected mobility business models

Digital customer management



Increase sales and marketing effectiveness and efficiency

Manufacturing and supply chain



Optimize manufacturing and supply chain operations

Data and analytics — Unlock the power of my data to create business value

Amazon as a partner for automotive transformation

Product innovation

Accelerate time to market and reduce development for new product innovations, including AV, EVs

- Virtually unlimited capacity and global scale of HPC and storage
- Deepest portfolio of ML/AI services for AV and smart product development
- Amazon's culture of innovation and mechanisms

Toyota Research Institute

Connected vehicles and mobility

Build intelligent, personalized features and revenue-generating mobility services

- Largest footprint and broadest selection of advanced services
- AWS IoT-based connected vehicle solution to start building with one-click
- Amazon e-commerce products and services ecosystem

Ford Motor Company

Digital customer management

Increase engagement across the customer journey and use data to improve marketing efficiency

- Largest selection of AI services and low-latency content delivery tools
- Virtually unlimited GPUs, to personalize content at scale
- Amazon retail and advertising platforms

Audi

Manufacturing and supply chain

Use connectivity, analytics, and ML to optimize manufacturing and supply chain operations

- Scalable data platform to connect global operations and transform your analytics
- Industrial IoT solution with integrated edge computing, ML, and analytics
- Amazon's robotics, automation, and logistics expertise

Volkswagen Group

Toyota Connected

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Toyota’s transformation begins

Auto giant to move from car-maker to provider of multiple commerce platforms

Connected

Autonomous

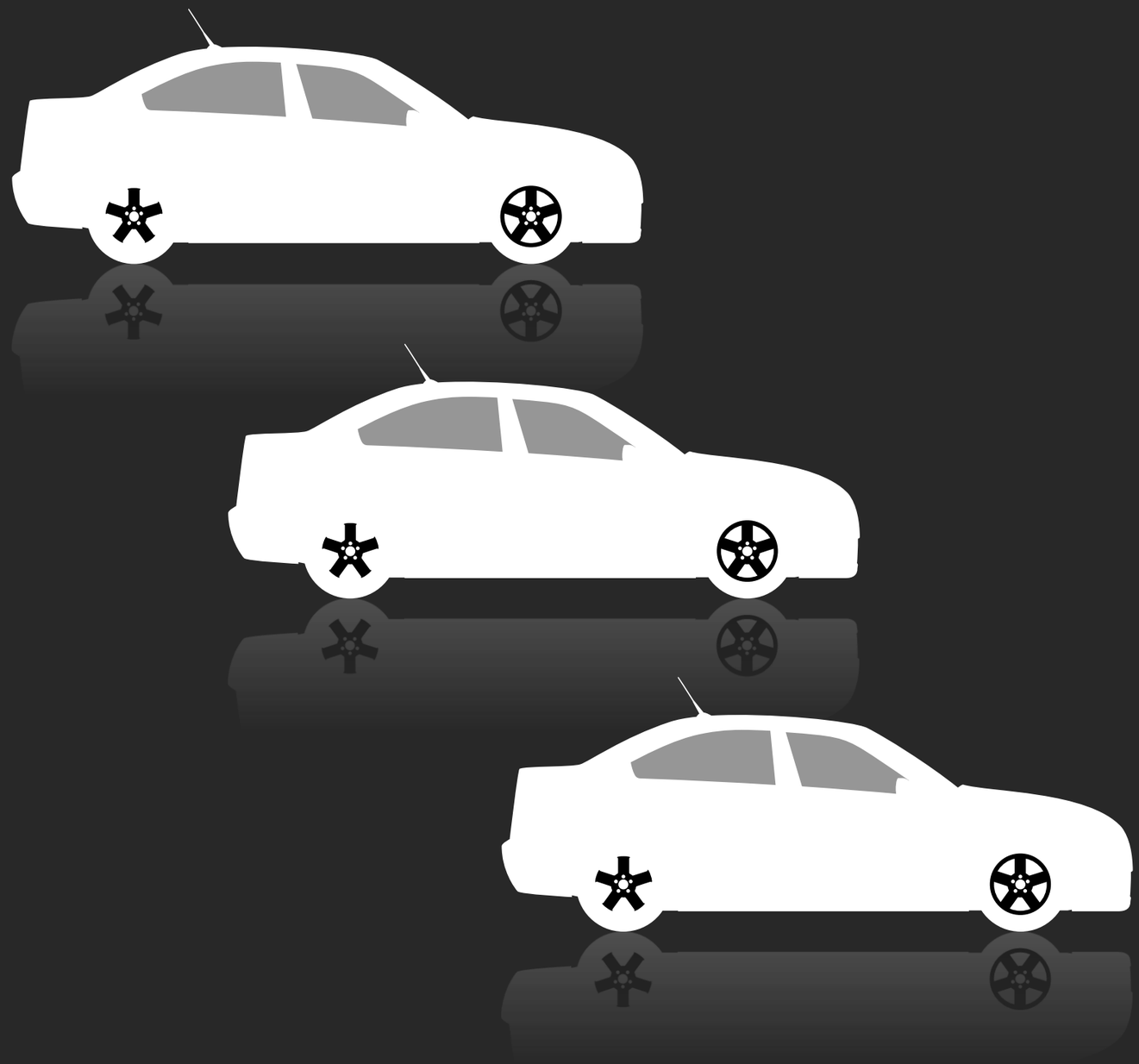
Shared

Electric

Shared

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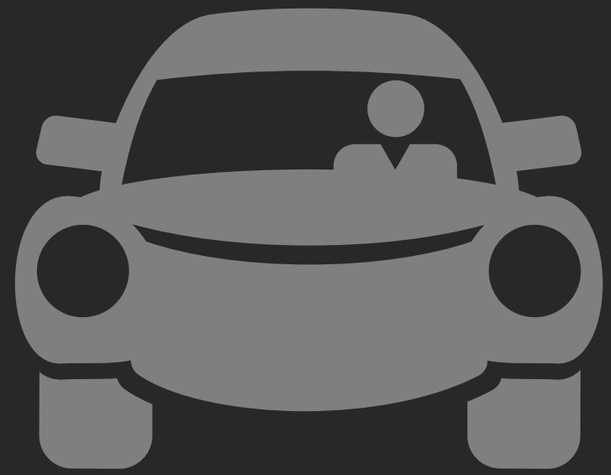
IN THE PAST,
COMPANIES
MADE CARS



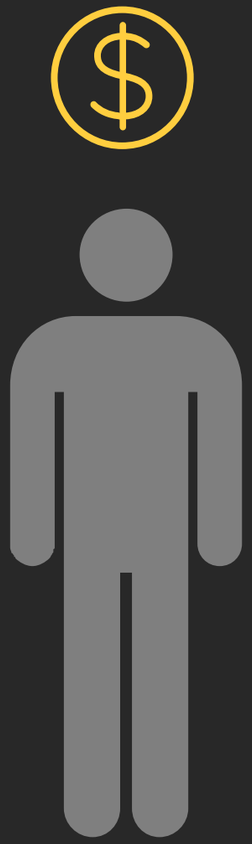
THEY SOLD THESE CARS TO CUSTOMERS IN THE TRADITIONAL RETAIL PROCESS



CREATING A 1-TO-1 RELATIONSHIP WITH A CUSTOMER

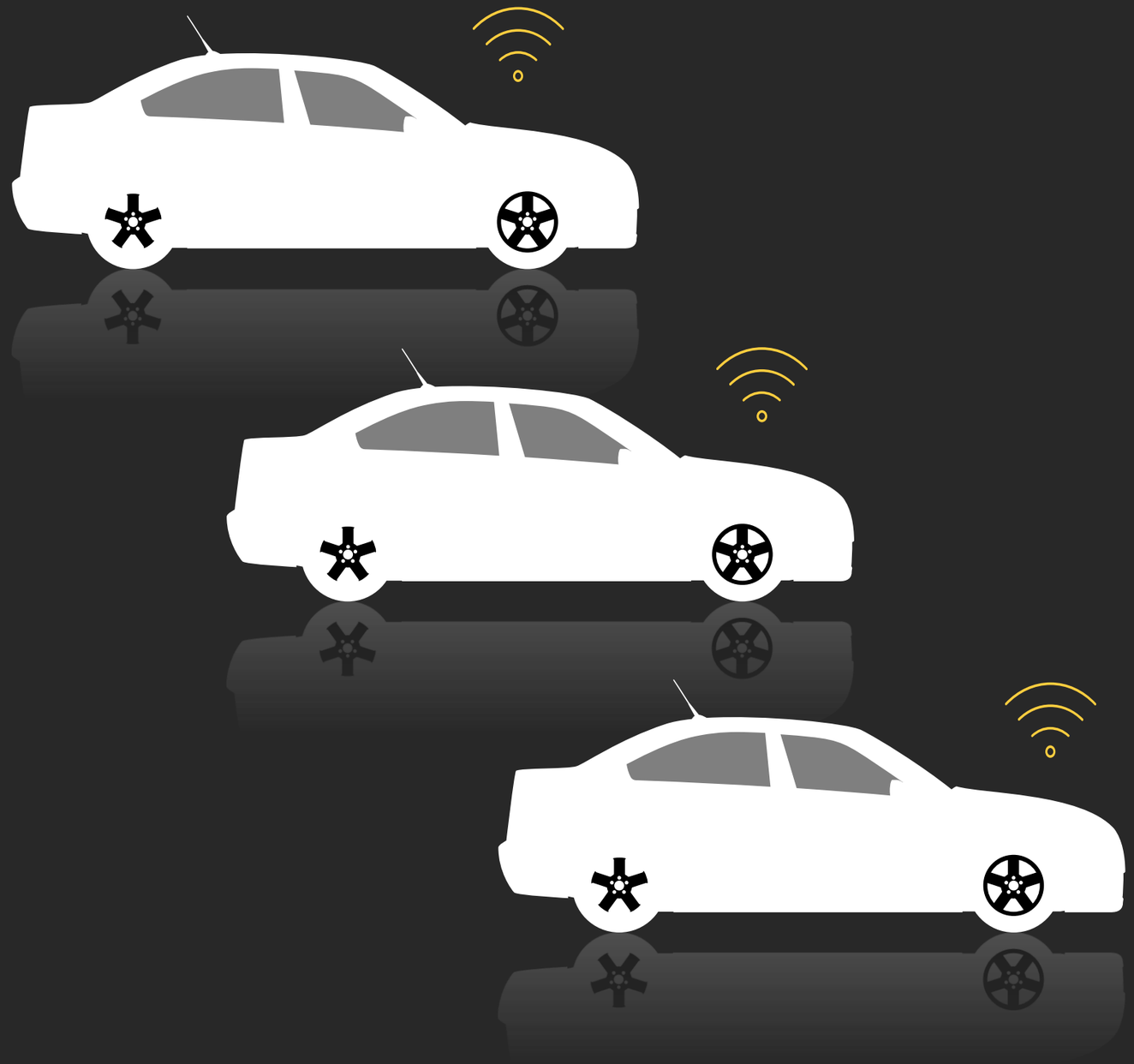


THE CAR
CREATED VALUE
FOR ONE CUSTOMER

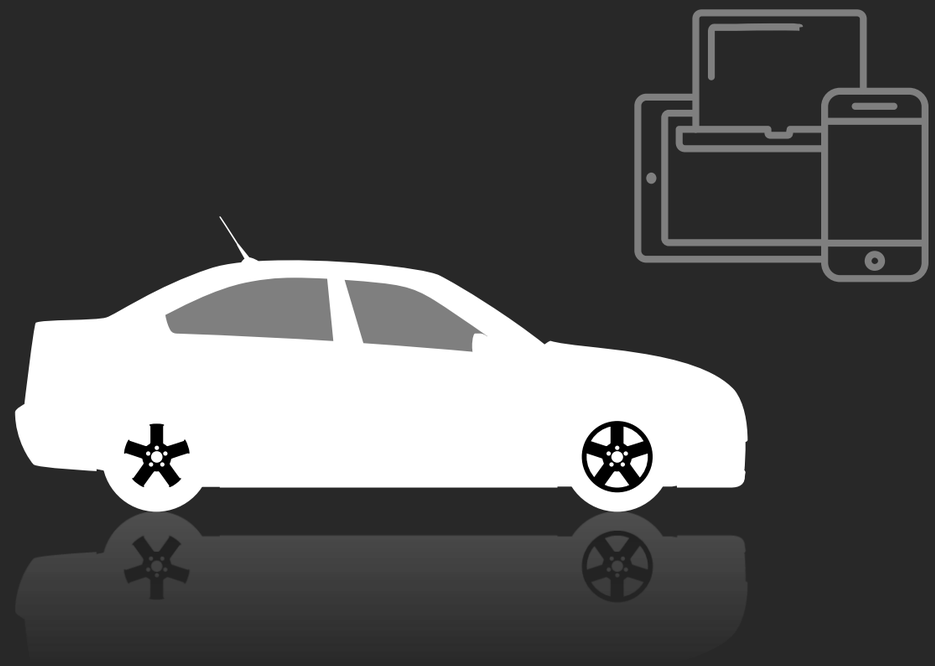


TODAY

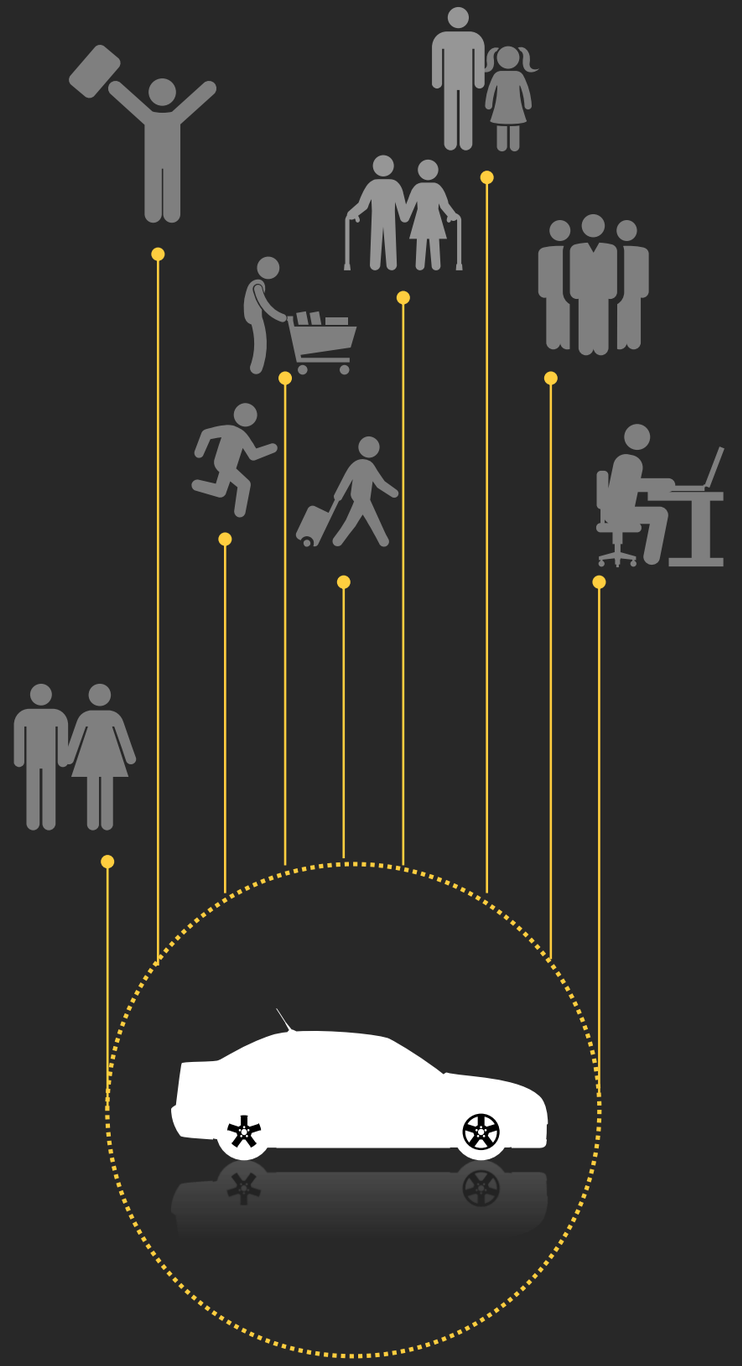
COMPANIES PROVIDE MOBILITY SERVICES



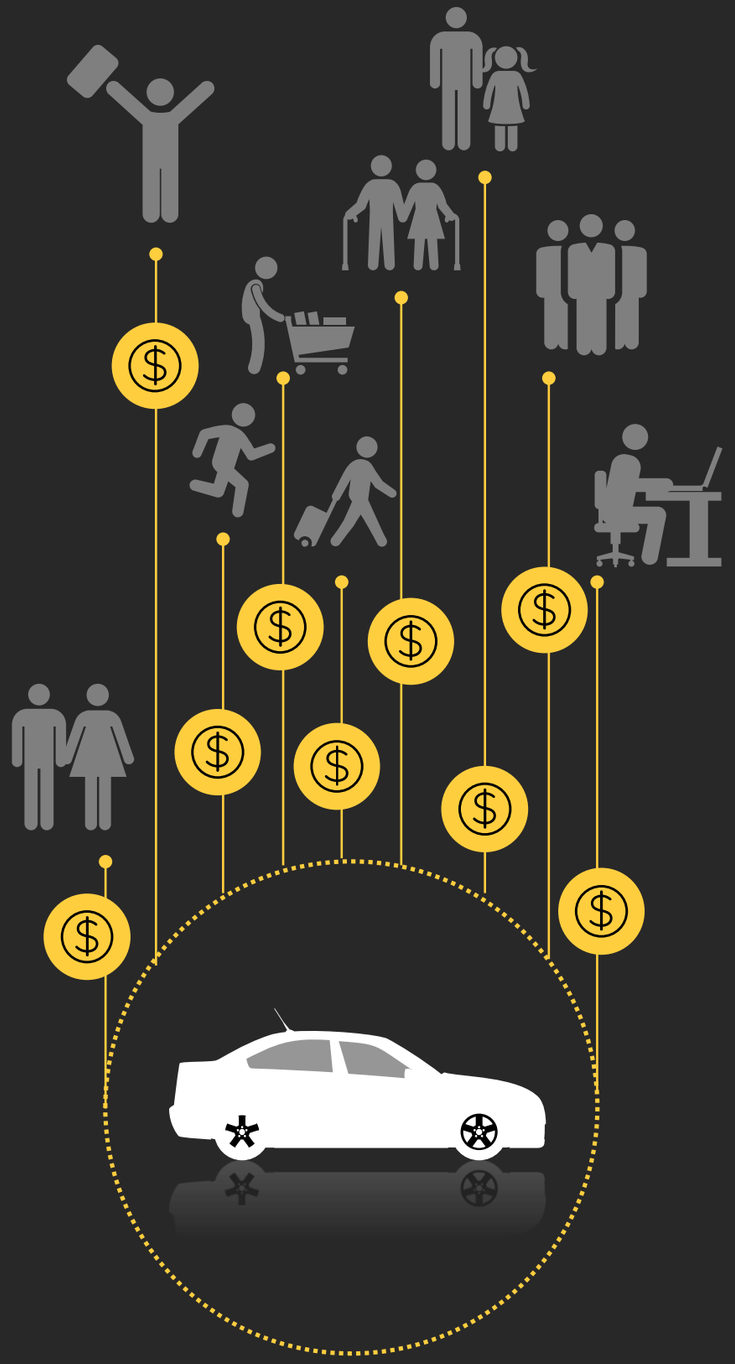
AND OFFER THESE SERVICES TO CUSTOMERS IN NEW WAYS



CREATING A 1-TO-MANY RELATIONSHIP WITH A MULTITUDE OF CUSTOMERS

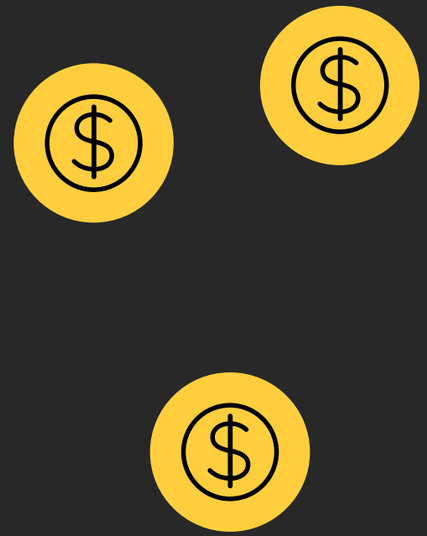


AND BEGIN TO
REDEFINE VALUE
FOR THESE
CUSTOMERS



UNCHANGED
BASIC CUSTOMER EXPECTATIONS

THE VALUE
MUST EXCEED
THE PRICE



THE EXPERIENCE
MUST EXCEED
THE FRICTIONS OF USE

Insights—Key cutters

Edited (icons) and text placement + notes



View car ownership as an inconvenient waste of money, but in some cases necessary

Want to take mass transit or share services over everything else

Currently almost completely unserved by automotive, but potential (24M Americans)







New segment emerging
“Key cutters”

Mobility Service Platform

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Mobility Services Platform V1



Optimizing our mobility platform

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Driver door open status

1



Driver door open status

0



How valuable is capturing **near constant** values?

VIN	MODEL		VALUE SELDOM CHANGES				
4T1B11HK5XXXXX	Camry	gpsDateTime	DoorOpenD	DoorOpenP	DoorOpenRL	DoorOpenRR	TrunkOpen
		2018-05-20T14:47:24	**1**	0	0	0	0
		2018-05-20T14:47:25	0	0	0	0	0
		2018-05-20T14:47:26	0	0	0	0	0
		2018-05-20T14:47:27	0	0	0	0	0
		2018-05-20T14:47:28	0	0	0	0	0
		2018-05-20T14:47:29	0	0	0	0	0
		2018-05-20T14:47:30	0	0	0	0	0
		2018-05-20T14:47:31	0	0	0	0	0
		2018-05-20T14:47:32	0	0	0	0	0
		2018-05-20T14:47:33	0	0	0	0	0
		2018-05-20T14:47:34	0	0	0	0	0
		2018-05-20T14:47:35	0	0	0	0	0
		2018-05-20T14:47:36	0	0	0	0	0
		2018-05-20T14:47:37	0	0	0	0	0
		2018-05-20T14:47:38	**1**	0	0	0	0
		2018-05-20T14:47:39	0	0	0	0	**1**

MUDA

How valuable is capturing **near constant** values?

VIN	MODEL		VALUE SELDOM CHANGES				
4T1B11HK5XXXXX	Camry	gpsDateTime	DoorOpenD	DoorOpenP	DoorOpenRL	DoorOpenRR	TrunkOpen
		2018-05-20T14:47:24	**1**	0	0	0	0
		2018-05-20T14:47:25	0				
		2018-05-20T14:47:38	**1**				
		2018-05-20T14:47:39	0				**1**

Compute

AWS re:Invent

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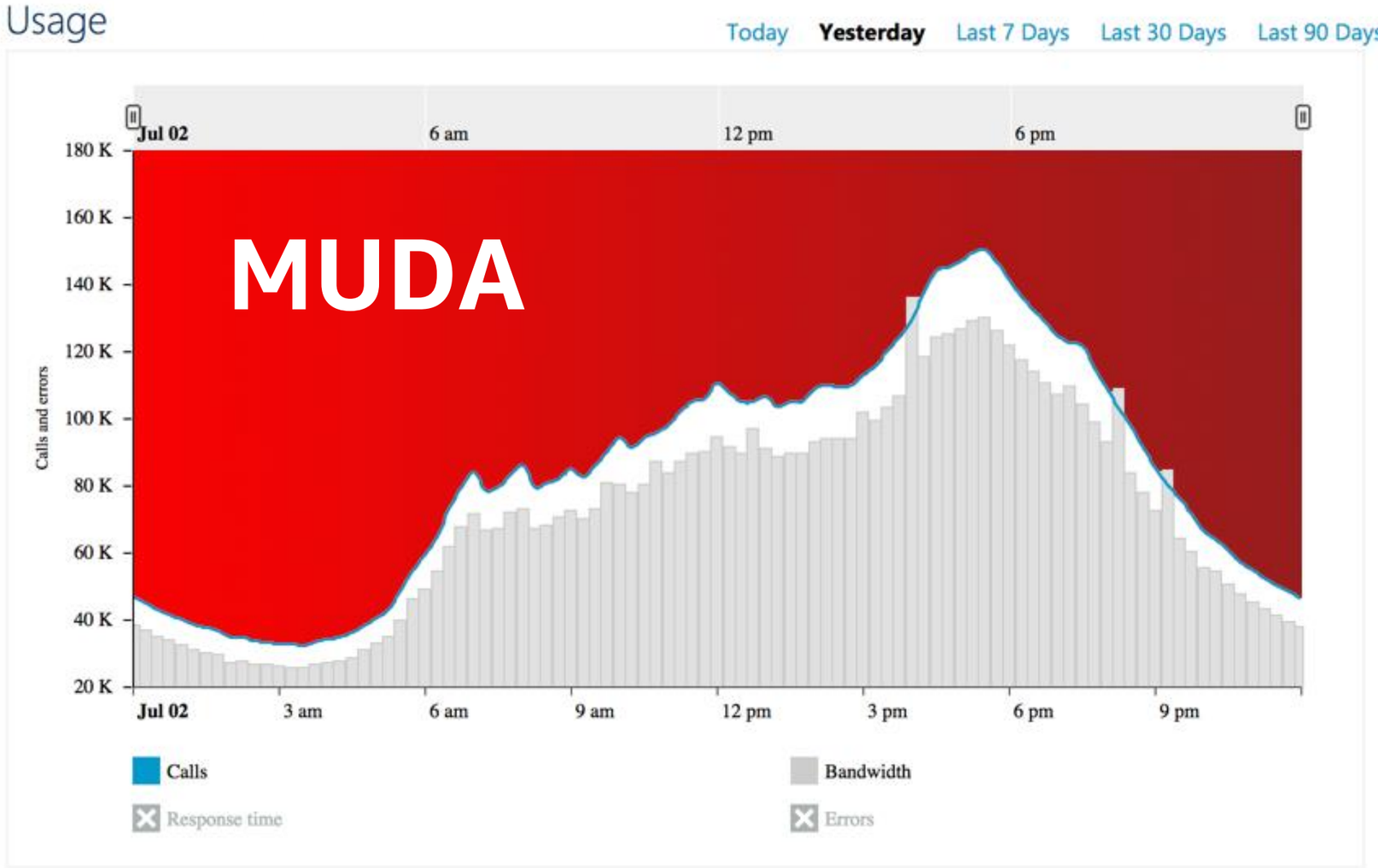
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Mobility Services Platform v1.0:
“Always on”



Minimum cost regardless of whether we are processing 1 vehicle or 100,000 vehicles

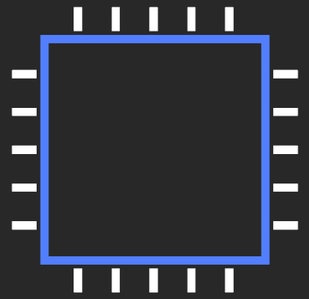
Mobility Services Platform v1.0:
“Always on”



Every message transmitted from a vehicle must have a purpose, provide quantifiable customer value, and be processed if and only when it is needed



Options



Reserved instance



Spot instance



Serverless



Taiichi Ohno

Just-in-time production

Make what is needed, only when it is needed, and only in the amount that is needed

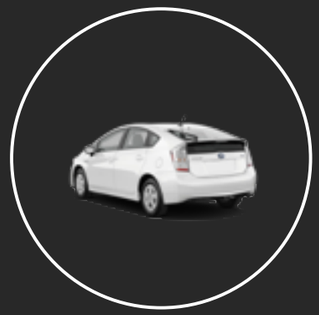


Mobility Services Platform v1.0

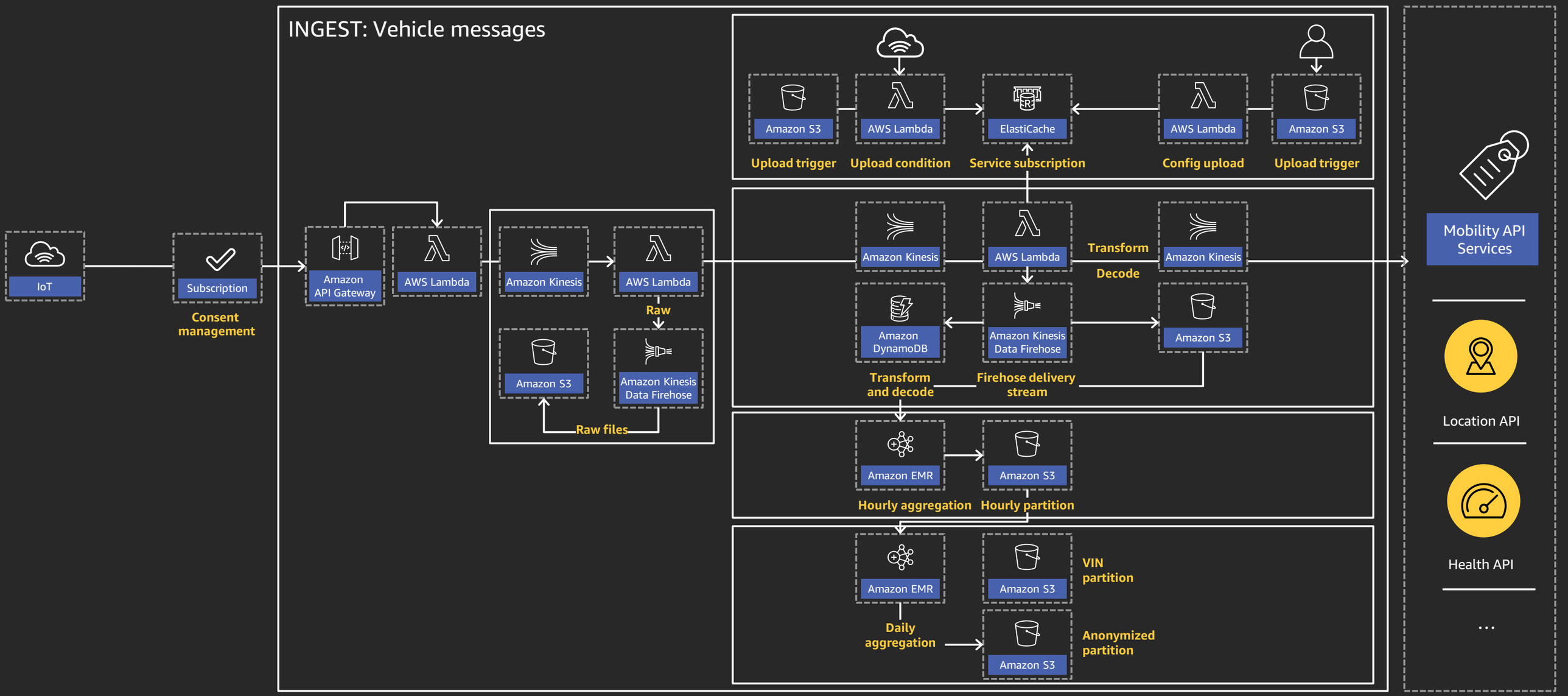
“Always on” architecture



Mobility Services Platform v2.0
“Serverless” architecture



Toyota mobility services data pipeline

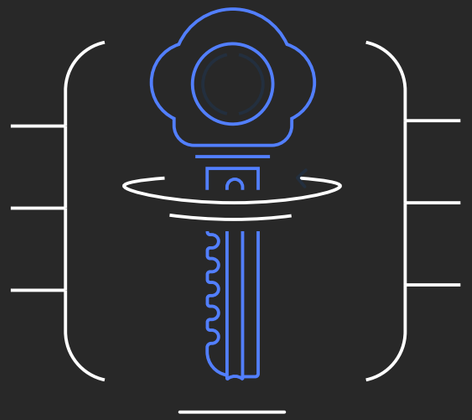


Mobility tuning

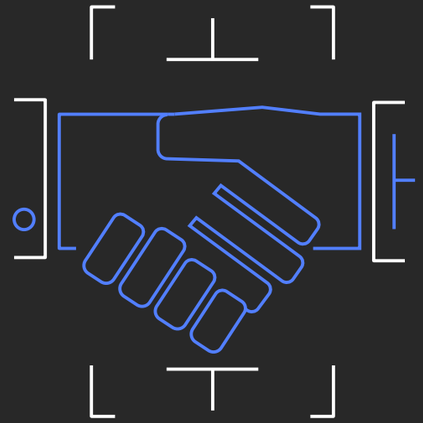


Platform shift

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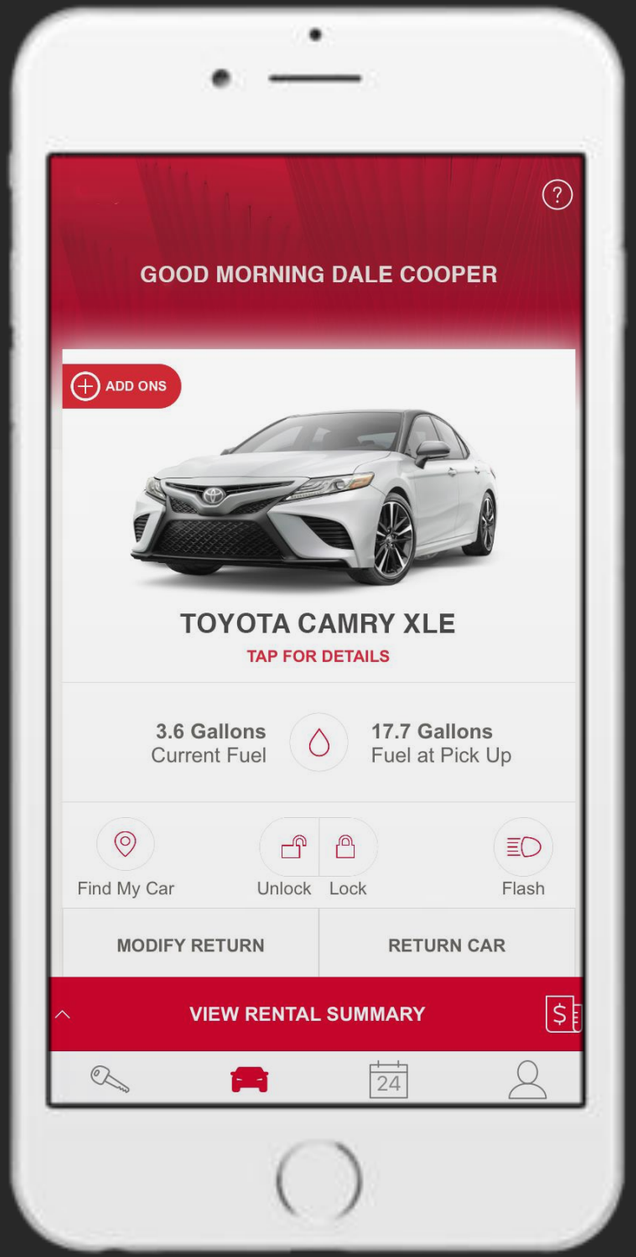
Closed platform

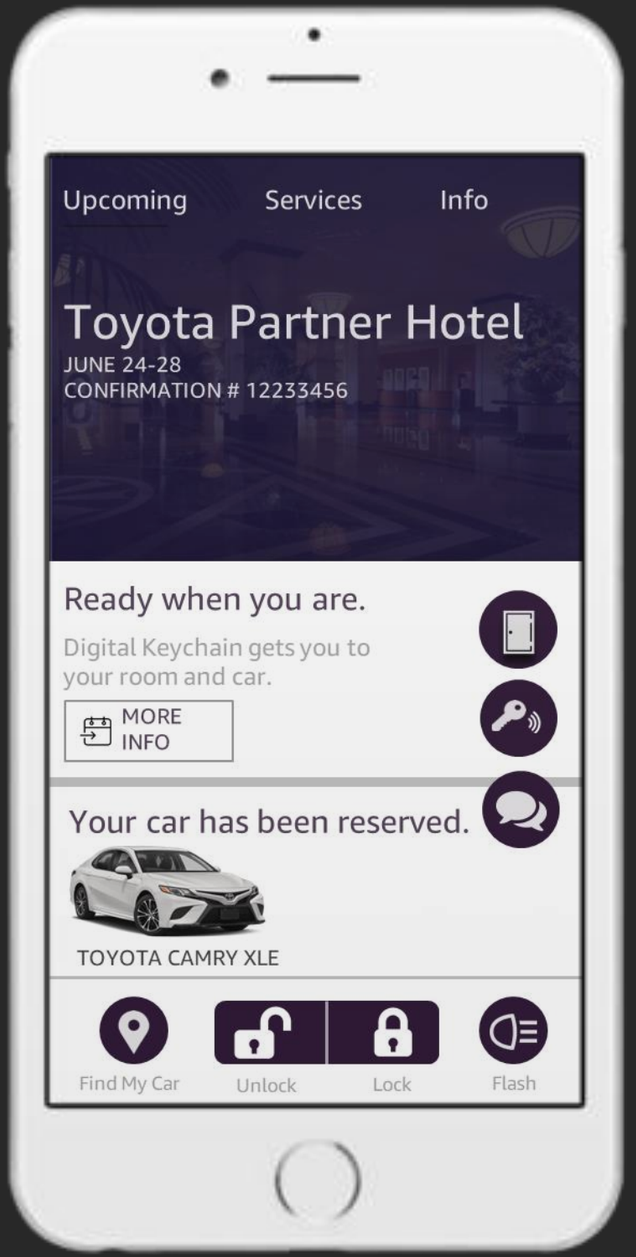


Open platform

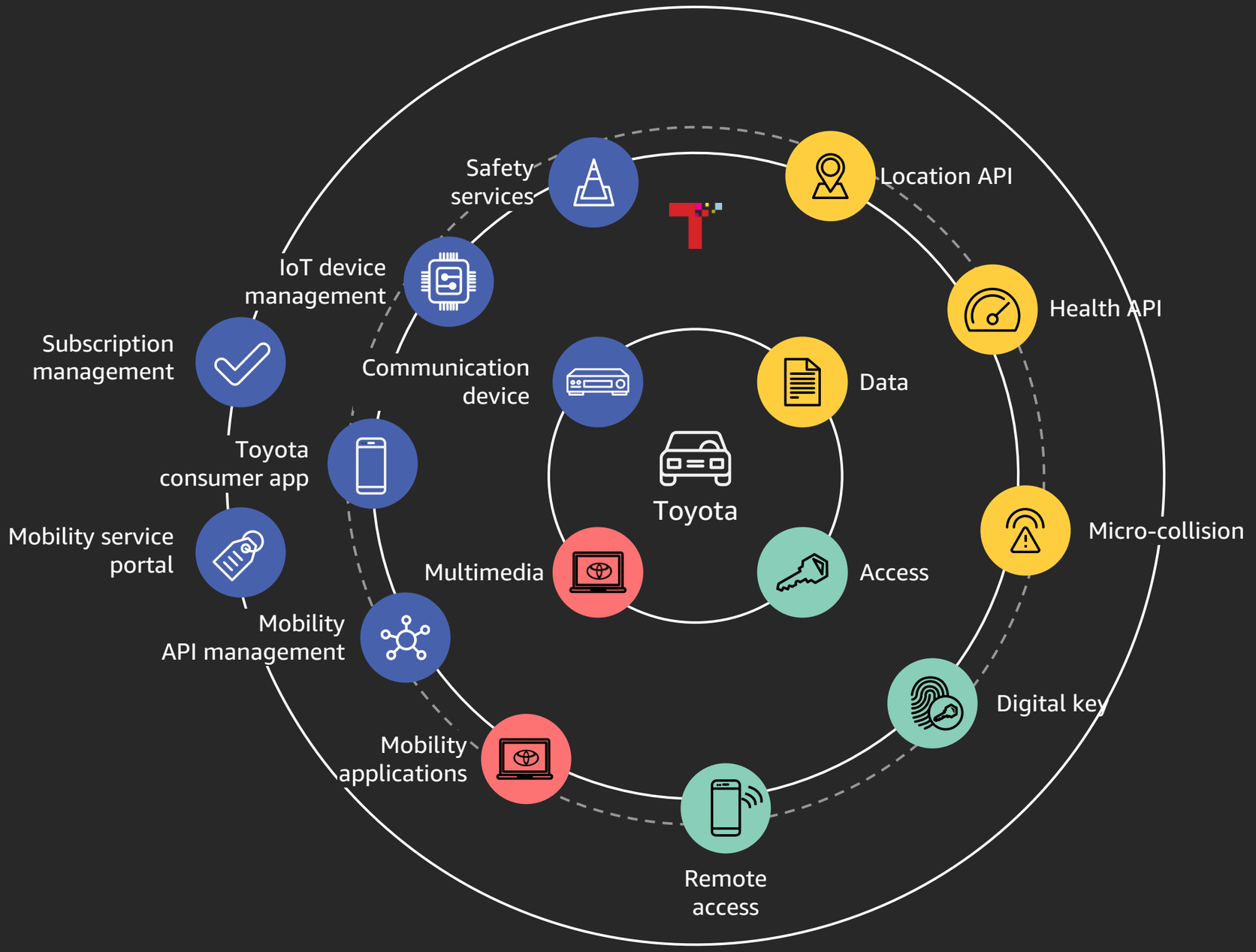
Customers want their technology:

Anywhere and everywhere!

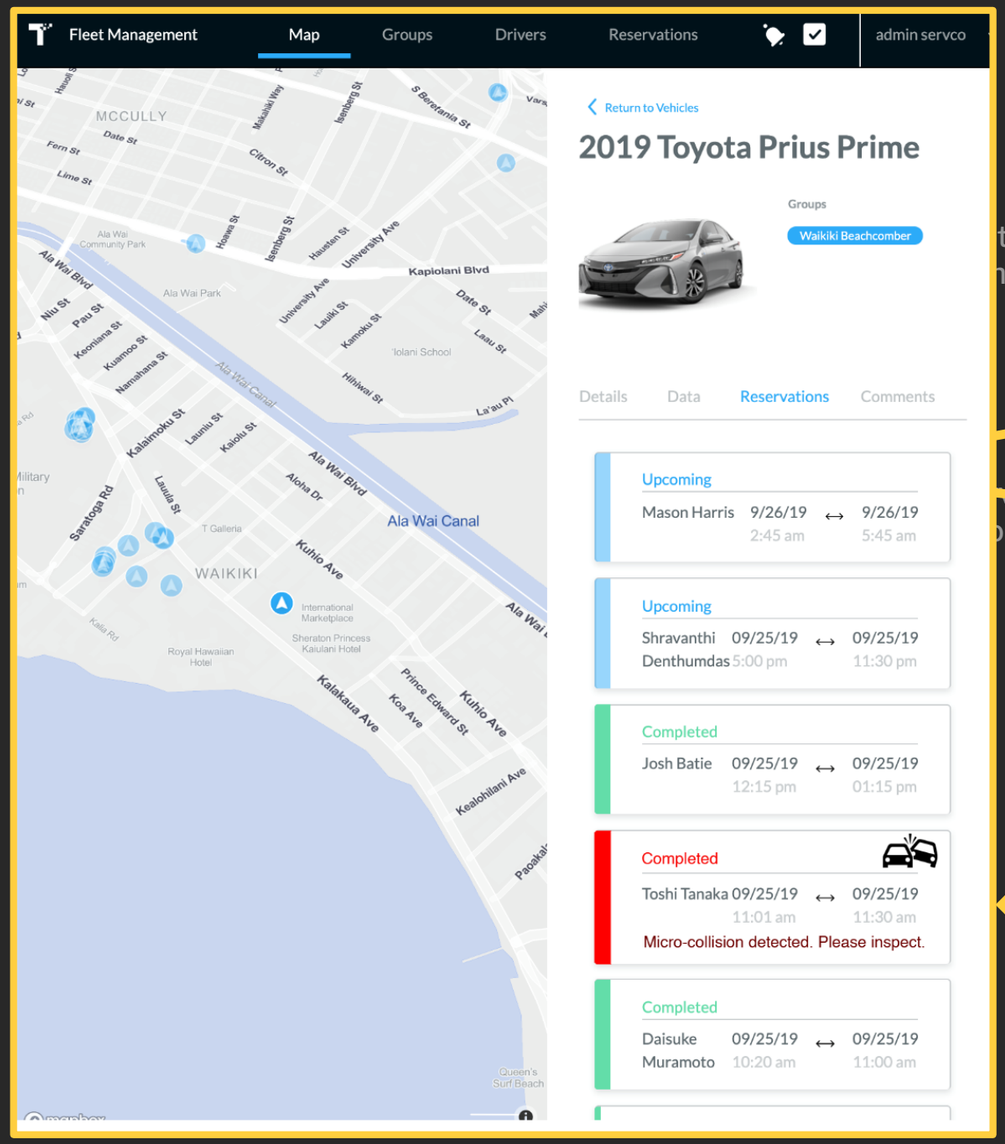


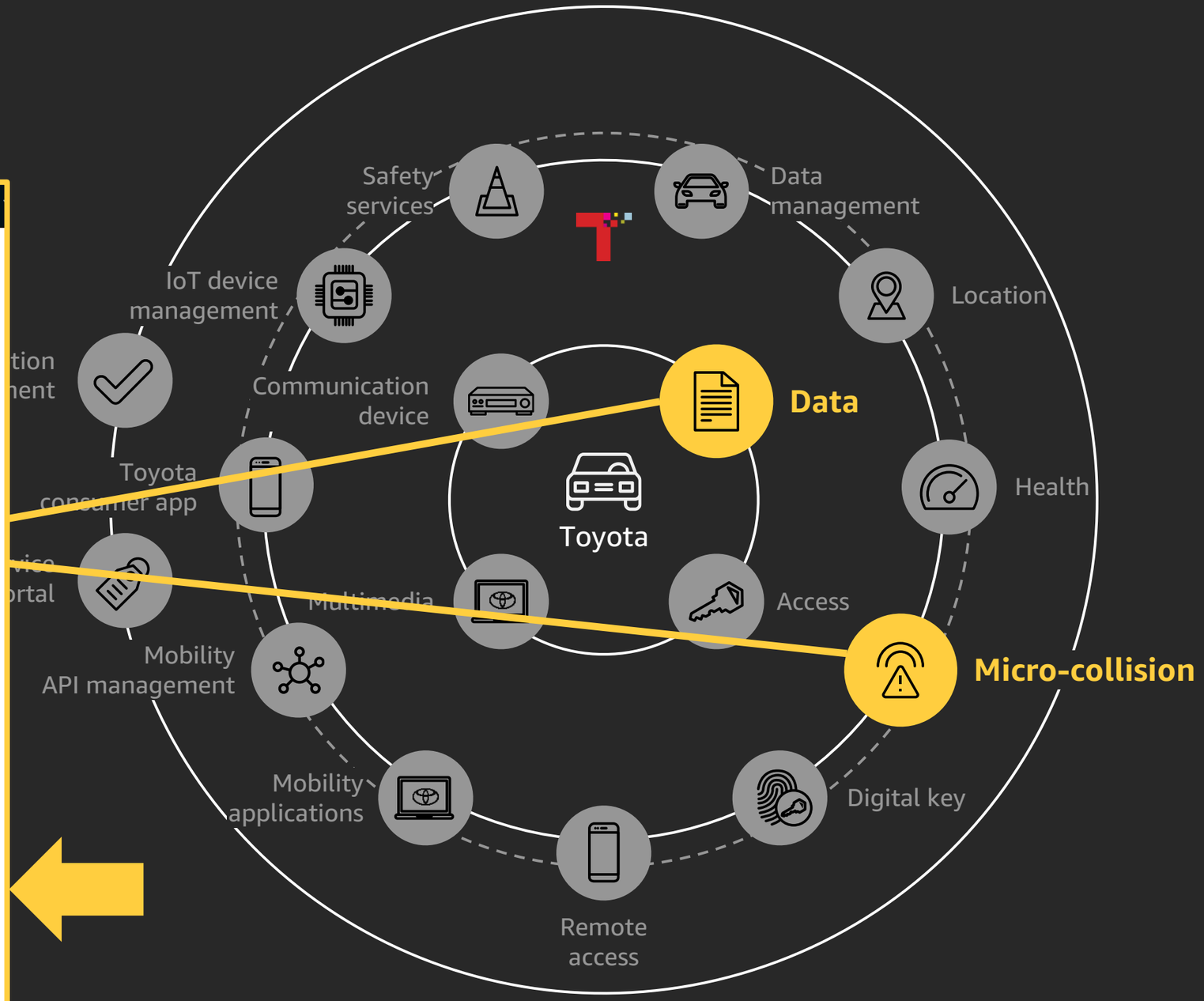


Open mobility services platform

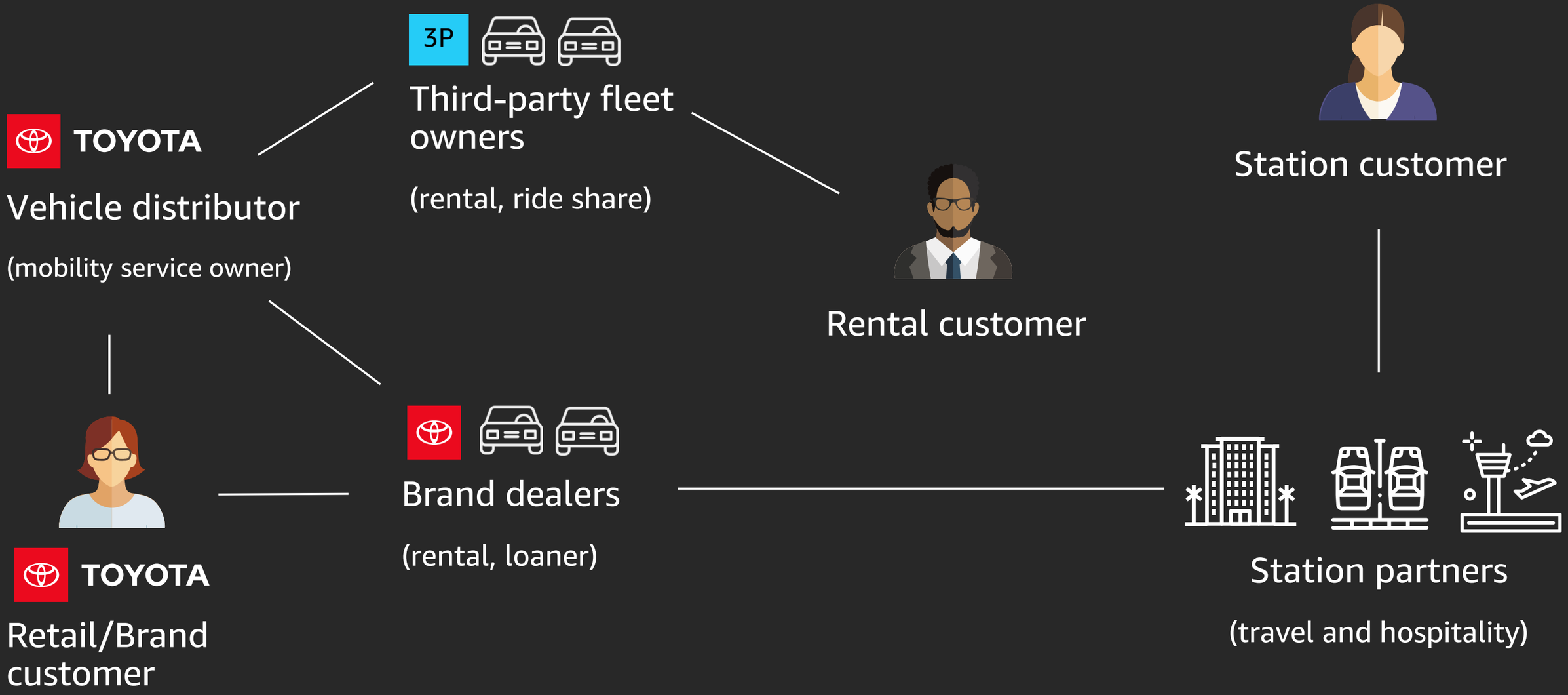


Micro-collision detection





Mobility partner ecosystem



Use case patterns



B2C

TOYOTA HQ Distribution → TOYOTA Customer

B2B

TOYOTA HQ Distribution → TOYOTA Dealer system



B2B2C

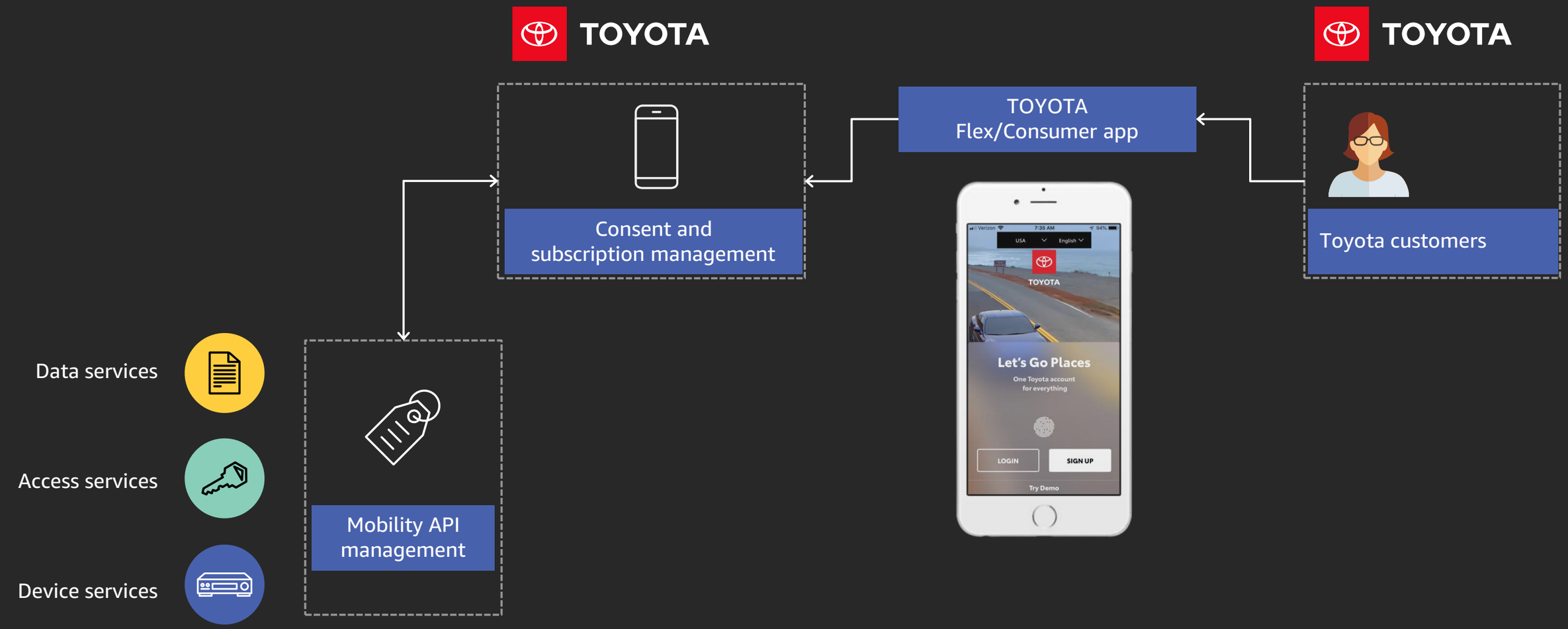
TOYOTA HQ Distribution → Third-party rental company → Third-party customer



B2B2B2C

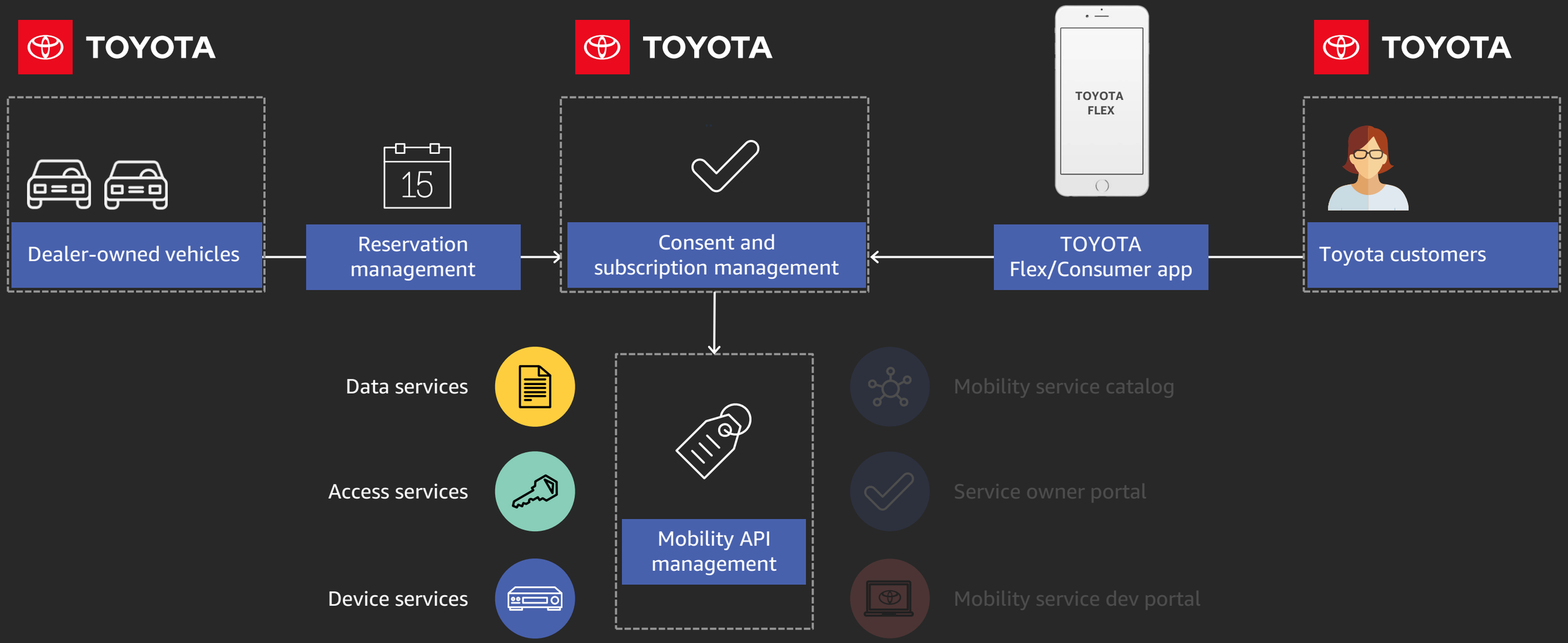
TOYOTA HQ Distribution → Toyota dealer → Station partner → Station customer

Digital key (retail)
B2C

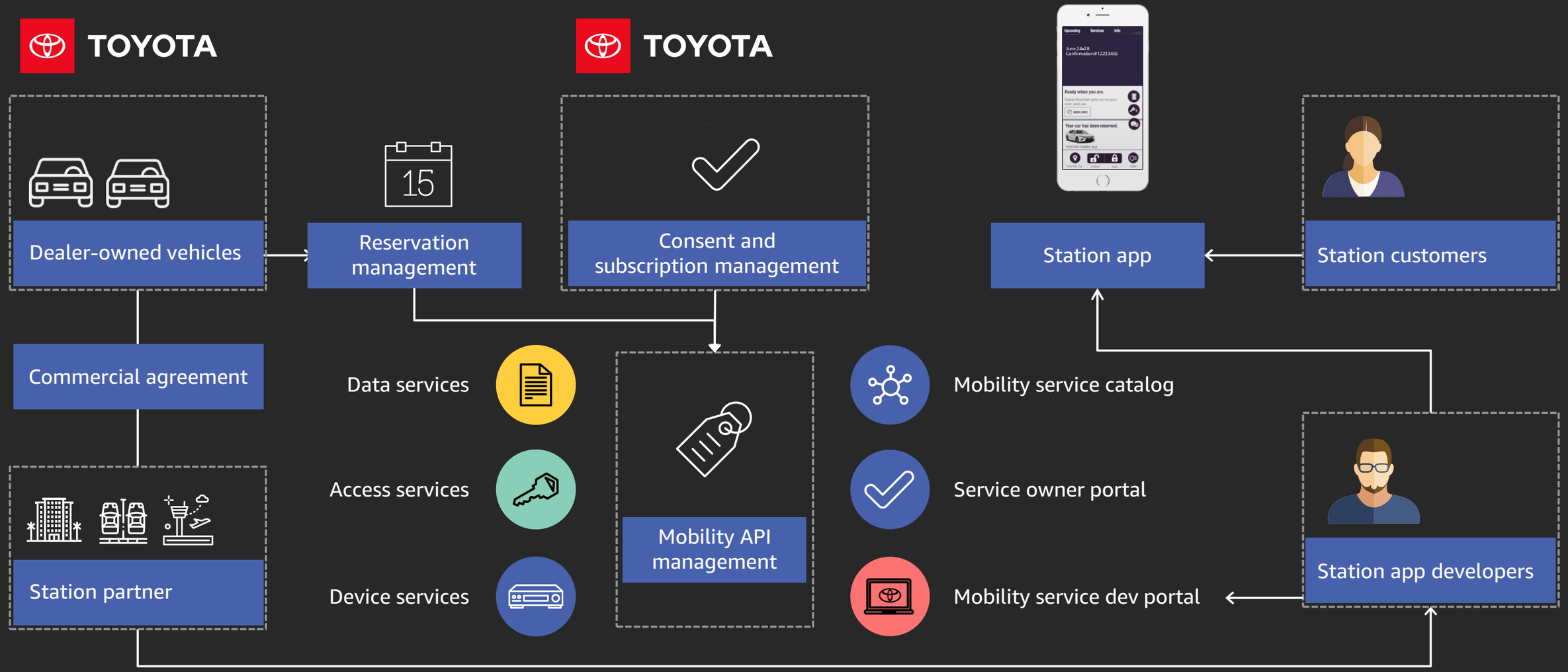


Toyota Flex: Dealer-connected mobility services

B2B2C

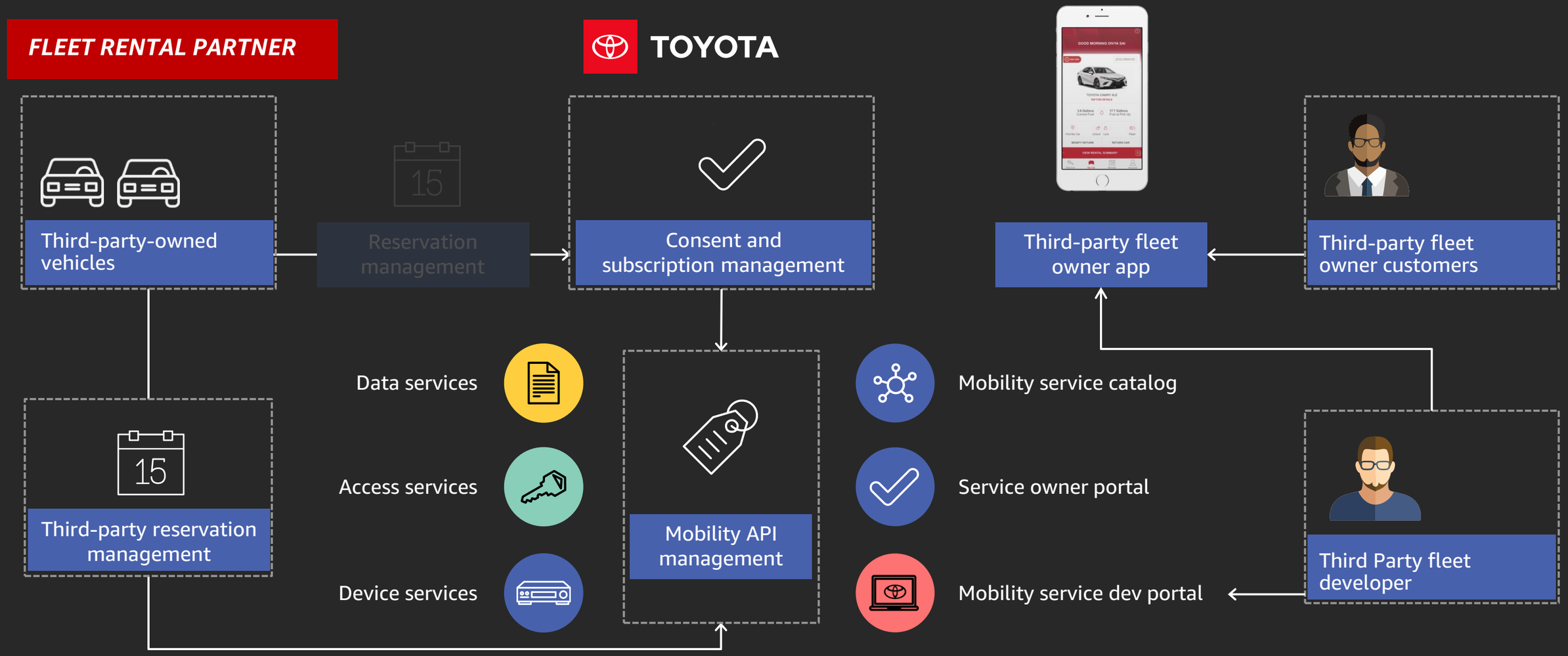


Toyota Flex—As a service (to station partners)
B2B2B2C

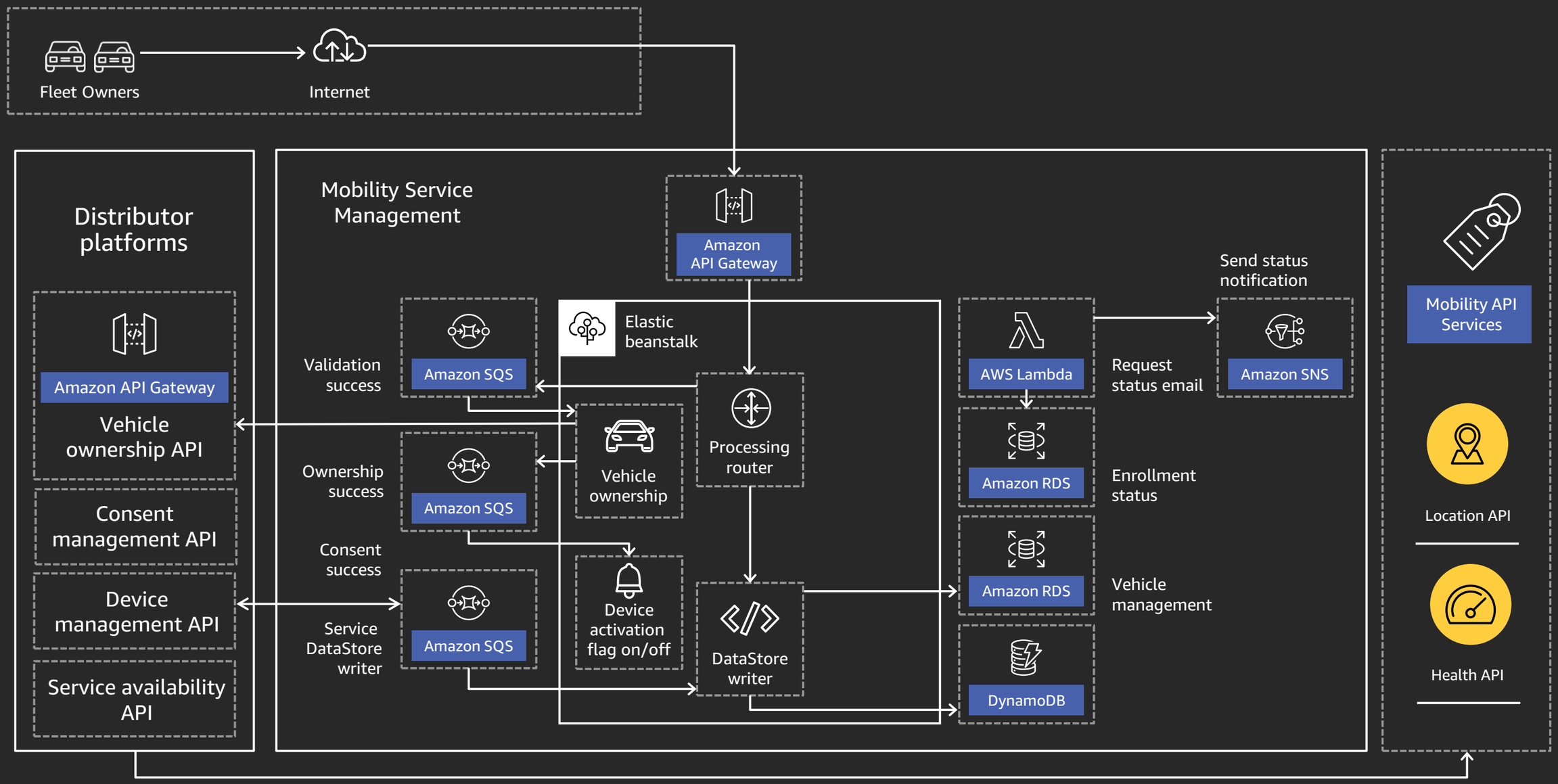


Distributor to third-party fleet owner

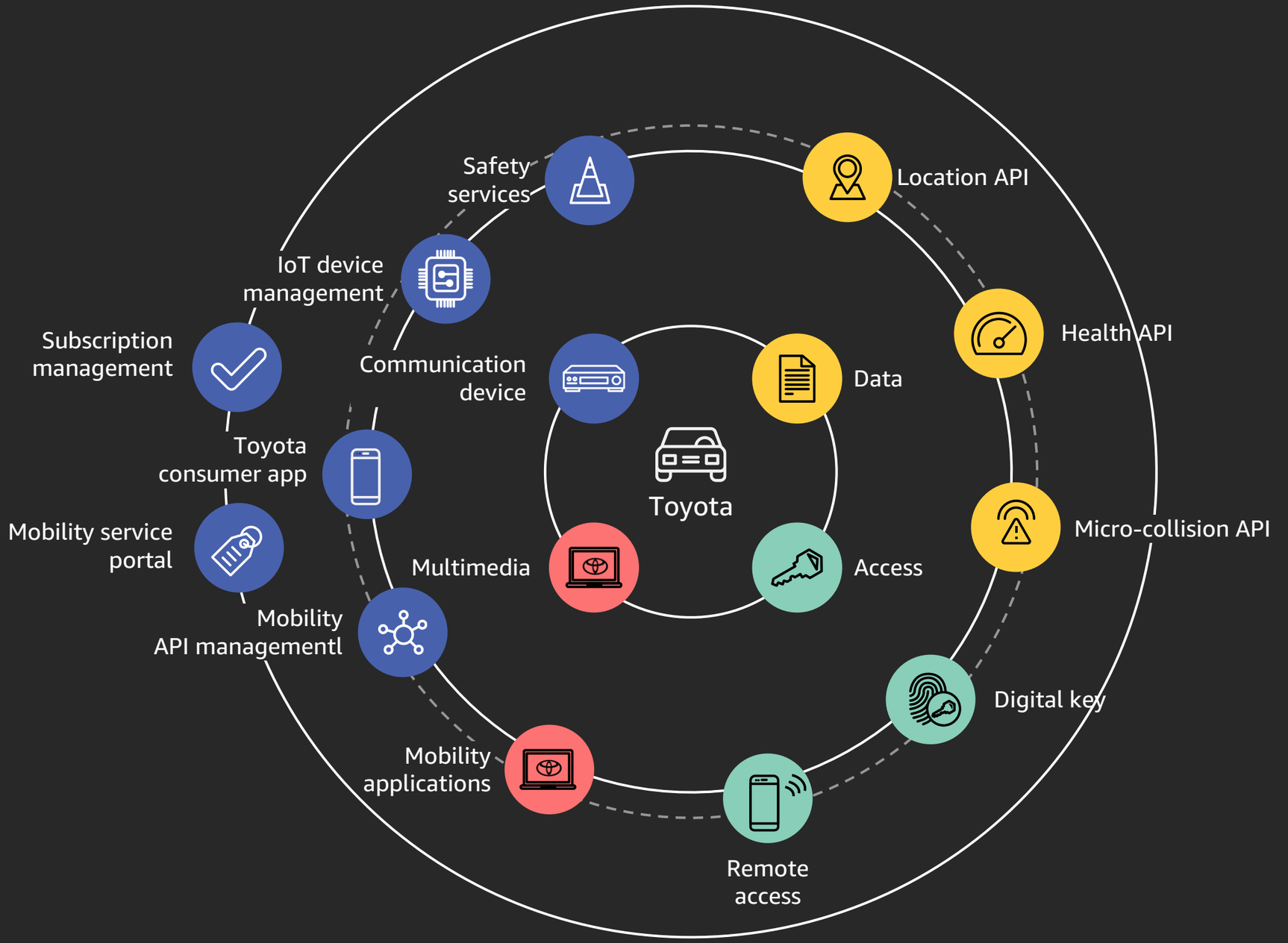
B2B2C



Mobility marketplace architecture



Open mobility services platform



AWS


AWS IoT Events
AWS Lambda
AWS IoT Greengrass
AWS Fargate
Application
AWS IoT Core
Compute
IAM
Amazon EC2
aws
AWS Service Catalog
Networking and content delivery
Analytics
Amazon API Gateway
AWS Elastic Beanstalk
AWS App Mesh
Amazon Kinesis
Amazon EMR

MOBILITY FOR ALL

Speaker meet & greet
Automotive & Manufacturing Networking Lounge

Aria Level 3, Ironwood Foyer

Schedule subject to change

Monday, December 2
10:00am – 5:00pm

10:00am – 12:00pm
General Automotive & Manufacturing Topics with AWS Industry Leaders

12:00pm – 1:30pm
Special Topic: Connected Vehicles

1:30pm – 3:00pm
Special Topic: Autonomous Vehicles

3:00am – 4:00pm
Speaker Meet & Greet:
AUT202-L: Toyota Connected

4:00pm – 5:00pm
Special Topic: Product Design

Tuesday, December 3
11:00am – 5:00pm

11:00am – 12:00pm
Speaker Meet & Greet:
INVISTA

12:00pm – 1:30pm
Special Topic: Smart Factory

1:30pm – 2:30pm
Speaker Meet & Greet:
AUT305: MOIA/Connected Mobility

2:15pm – 4:30pm
Featured Session Sponsored by Accenture

4:30pm – 6:00 pm
Special Topic: Creating connected vehicle shadows using AWS IoT (AUT402)

Wednesday, December 4
9:00am – 5:00pm

9:00am – 11:00am
General Auto & Manufacturing Topics

11:00pm – 1:00pm
Special Topic: Smart Product Solutions

1:00pm – 2:00 pm
Speaker Meet & Greet:
AUT306: BMW Group/Data Lakes

2:00pm – 3:00pm
Special Topic: Electronic Design Automation

3:00pm – 5:00pm
Speaker Meet and Greet:
MFG204/IOT339: Volkswagen

5:00pm – 6:00pm
Speaker Meet & Greet:
AUT307: Mobileye

Thursday, December 5
11:00am – 3:00pm

11:00am – 12:00pm
Special Topic: Australia Manufacturing

12:00pm – 1:30pm
Special Topic: Building AR/AI automotive owner applications with AWS (AUT401)

1:30pm – 3:00pm
Special Topic: Supply Chain Management

3:00pm – 4:30pm
Special Topic: Computer Vision at the Edge

4:30pm – 6:00pm
General Automotive & Manufacturing Topics with AWS Industry Leaders

Network, relax, meet session speakers, and learn from Auto/MFG specialists

Thank you!

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