Arm: Preparing for the future

Ian Thornton, Head of Investor Relations

Arm is a subsidiary of SoftBank

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Preparing for the future

Predicting the future

Investing for the future

Financing for the future

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Predicting the future

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August 1991: Arm invited all its customers to Cambridge

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August 2017: Arm Partner Meeting “Architecting Tomorrow”

August 2017: Arm Partner Meeting “Architecting Tomorrow”

800 customers and partners

600 Arm managers and engineers

50 technology presentations

3,500 meetings to align roadmaps

Technology demonstrations

August 2017: Arm Partner Meeting “Architecting Tomorrow”

Discussed long-term technology trends >10 years

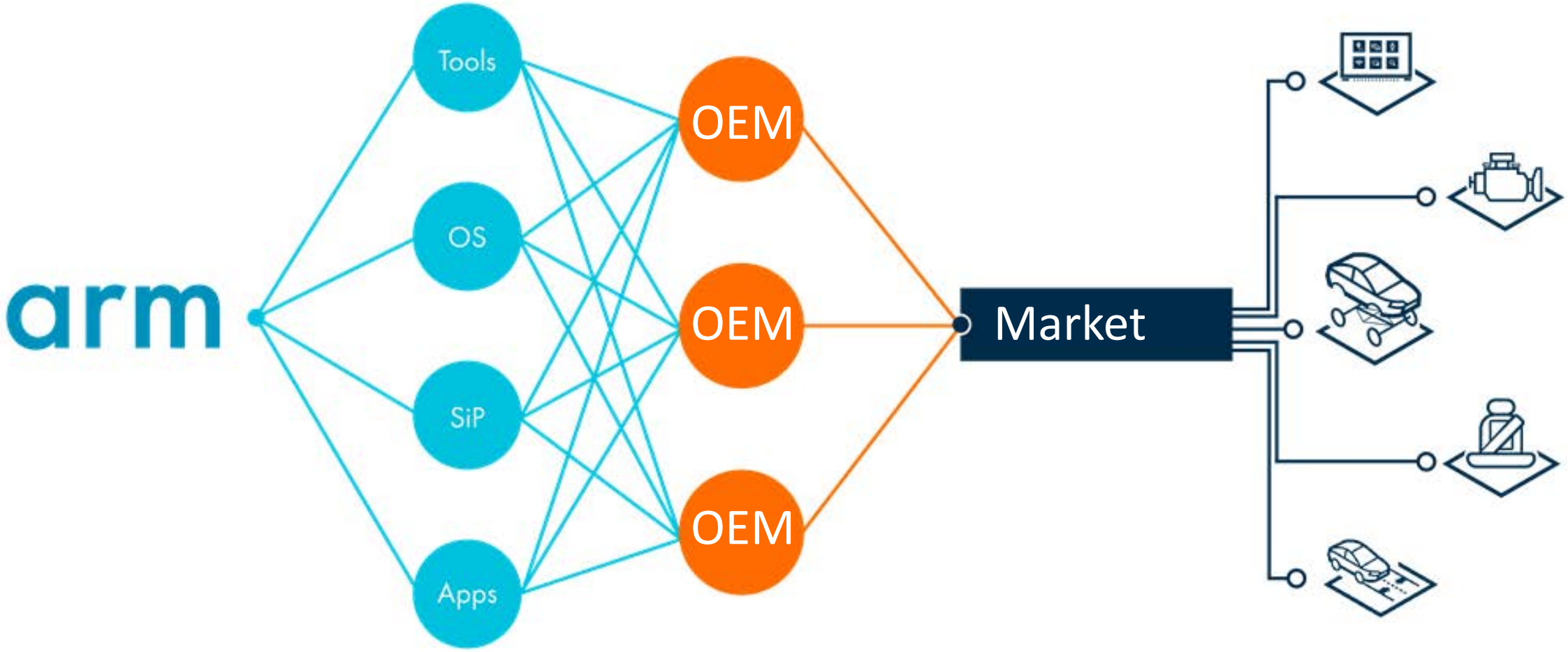
Shared and aligned roadmaps over next 5 years

Agreed specifications for products in 2 years time

Initiated sales cycles for product to be delivered next year

Signed agreements for Q2 2017

Arm works across and deep into each market



Also foundry and EDA
for manufacturing

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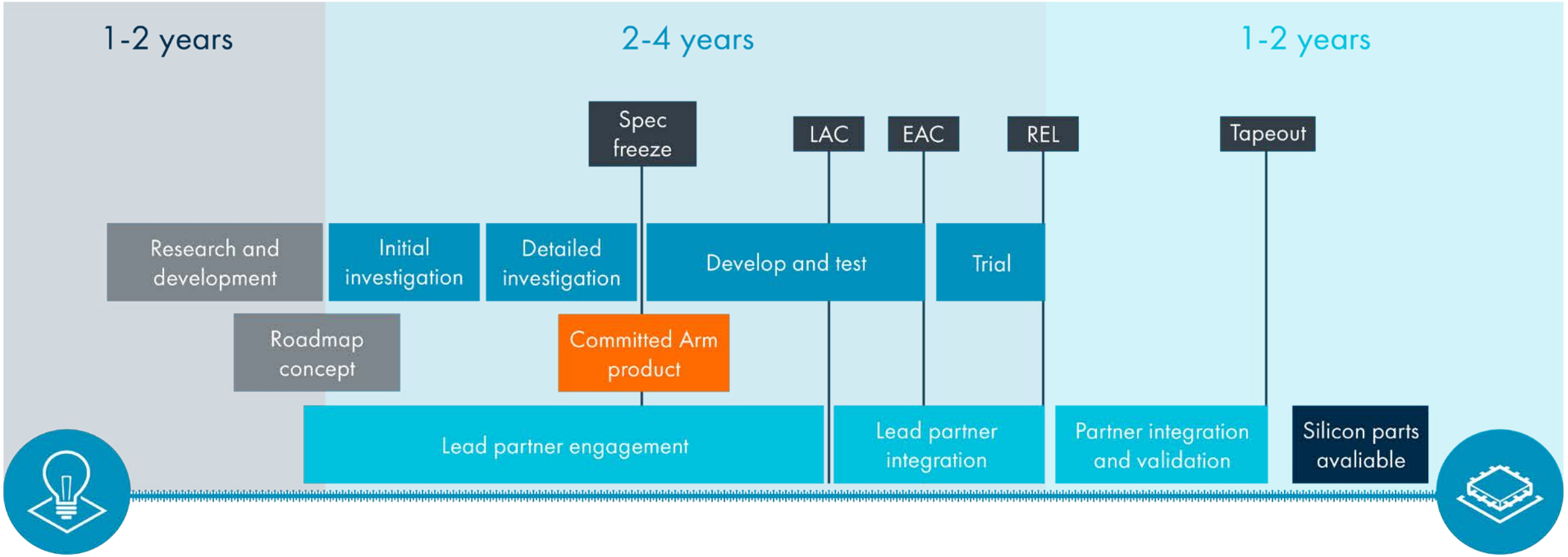
Arm product development



Continuous engagement with OEM, S/W vendors, EDA, tools, foundries, etc.

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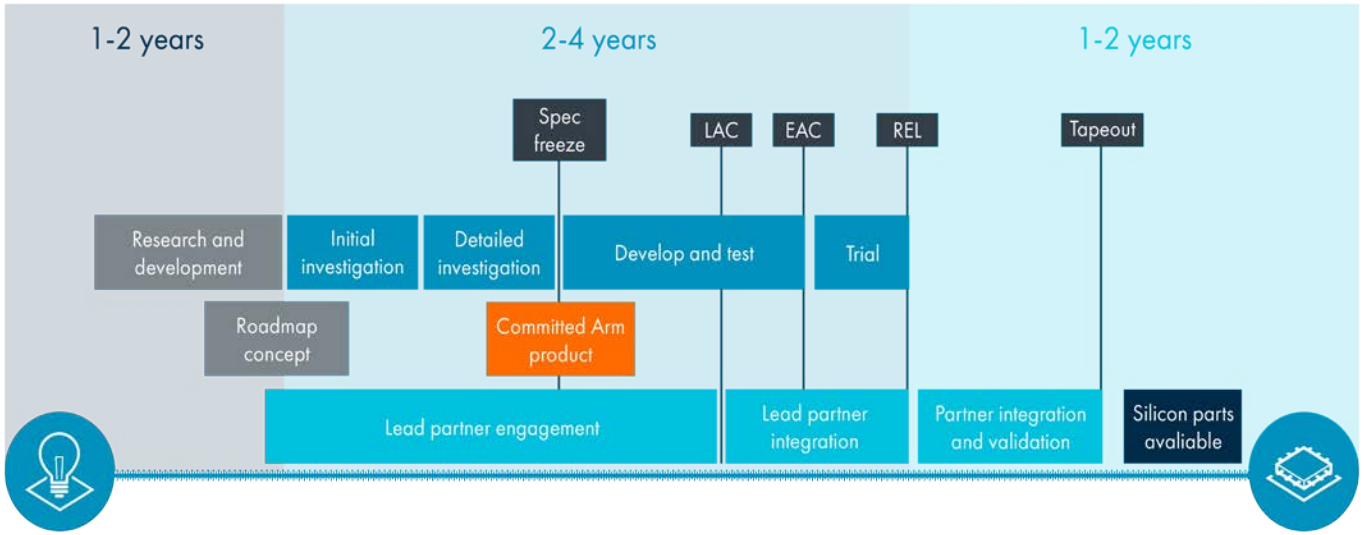
Arm product development



1-5 years

Software

Systems

Product

Continuous engagement with OEM, S/W vendors, EDA, tools, foundries, etc.

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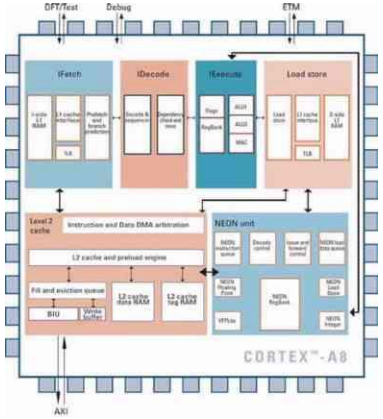
Case study #1: Accidentally winning the tablet

First +1GHz Arm processor

In 2003, Arm started to work on the first Arm processor targeting 1GHz (on 65nm)

In 2004, Arm acquired Artisan for $1bn (50% of Arm's market cap)

Codename: Tiger



Cortex-A8

Targeting the MID (Mobile Internet Computer)

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Case study #1: Accidentally winning the tablet

Arm's roadmap was heading towards the laptop

In H1 2006, Intel sold its Arm mobile business to Marvell

In H2 2006, Arm learnt that Intel was developing "Atom" – a low power x86 for mobile

In H1 2008, Intel introduced Atom chips for mobile

First Apple iPad 2010

Apple A4 SOC based on Cortex-A8 running at 1GHz

First Android Tablet 2009

Archos 5; TI OMAP3 Cortex-A8 running at 0.8GHz

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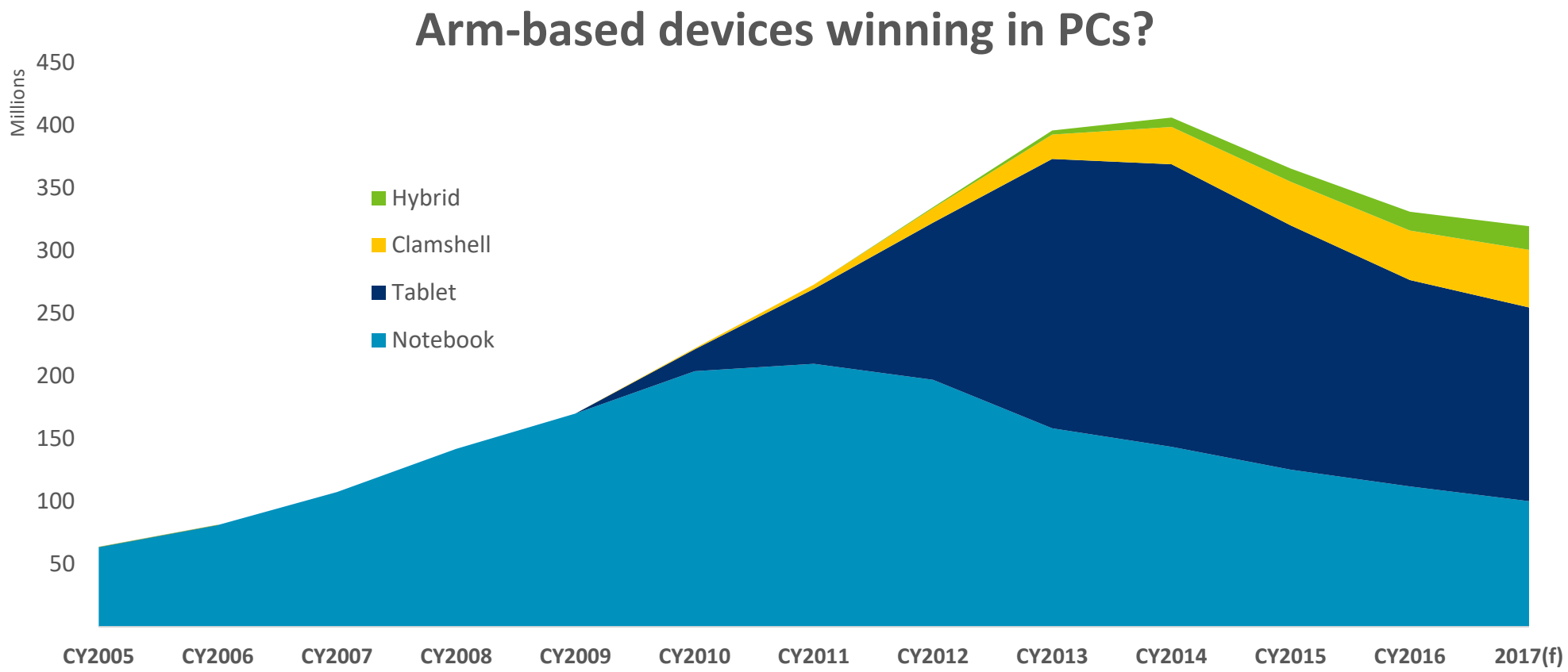
Case study #1: Accidentally winning the tablet

And turning one of our biggest customers into a competitor



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Case study #2: AI is not just a cloud technology

- Today majority of AI workloads are run in the cloud
- Training algorithms need huge amounts of compute

- In the future, trained algorithms will run on inference engines – these are much simpler and will run on client devices (phones, camera, cars, etc.)

Case study #2: AI is not just a cloud technology

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Investing for the future
mirror_mod.use_x = False
mirror_mod.use_y = True
mirror_mod.use_z = False
elif _operation == "MIRROR_Z":
mirror_mod.use_x = False
mirror_mod.use_y = False
mirror_mod.use_z = True
#selection at the end -add back the deselected mirror modifier object
mirror_ob.select= 1
modifier_ob.select=1
bpy.context.scene.objects.active = modifier_ob
print("Selected" + str(modifier_ob)) # modifier ob is the active ob
#mirror_ob.select = 0

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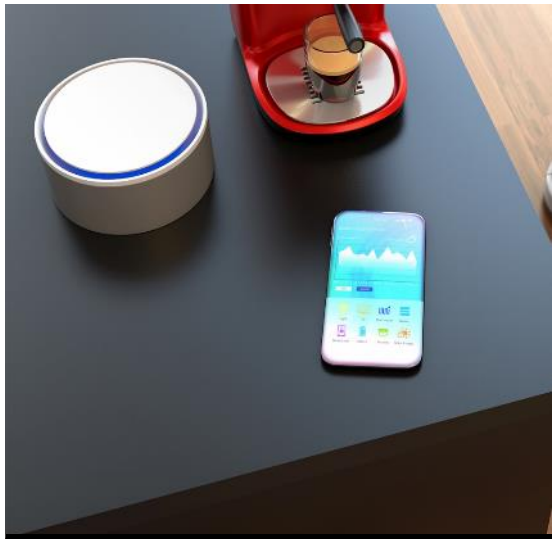
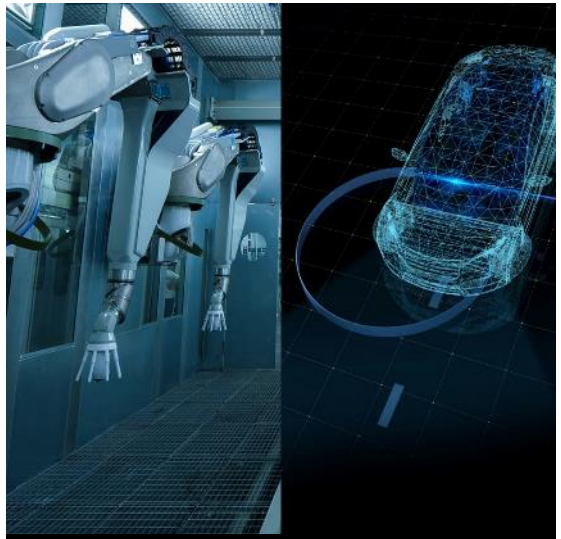
Technology trends that will redefine all industries



Artificial Intelligence in every device



Autonomous machines

Augmented reality

Hyperscale cloud and connectivity

Security and Privacy

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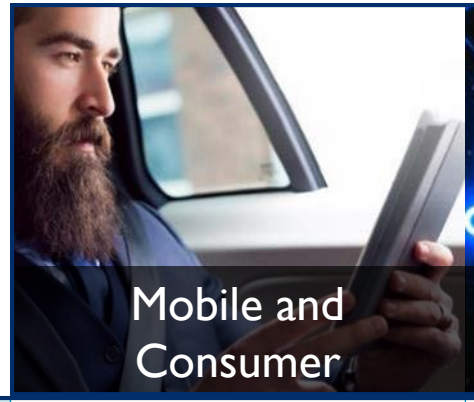
Arm defines the technology that will redefine all industries

	 Mobile and Consumer	 Networking and Servers	 Automotive and Robotics	 Internet of Things
Artificial Intelligence in every device	✓	✓	✓	✓
Autonomous machines			✓	✓
Augmented reality	✓		✓	
Hyperscale cloud and connectivity		✓		✓
Security and Privacy	✓	✓	✓	✓

Journey of the autonomous automotive

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“90% of automotive innovation comes from electronics (semiconductors) and software.”

– Audi at CES Asia

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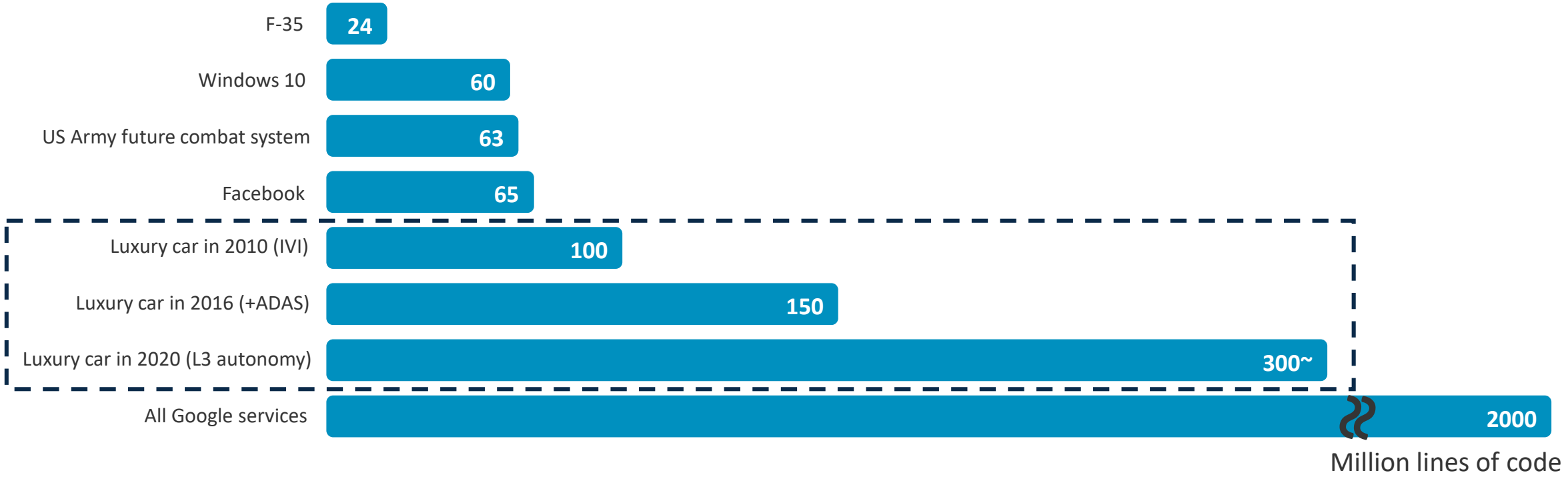
Cars run on code



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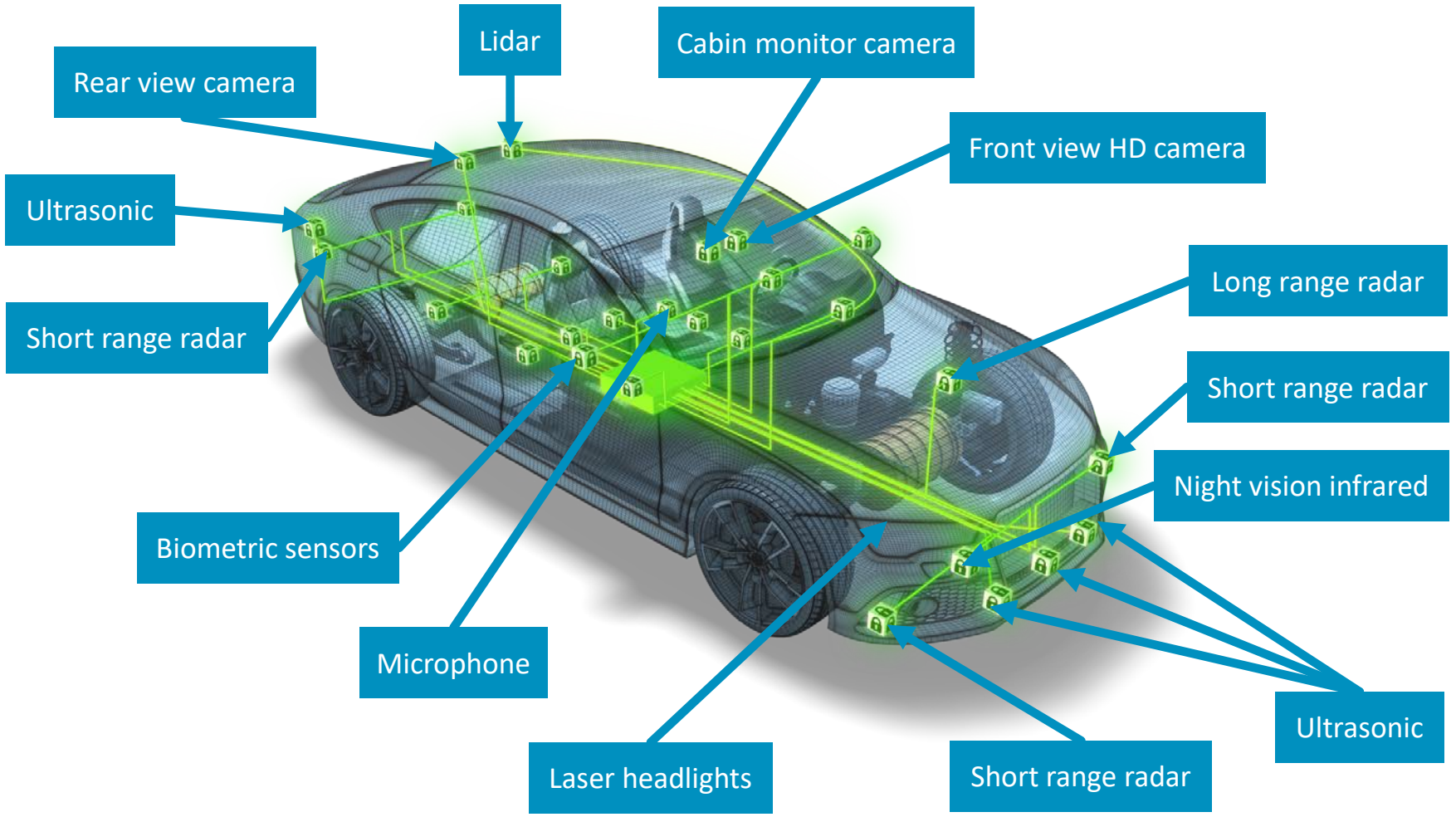
Distributed sensors in a car

200 sensors will be used in a car by 2020



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Human driving a car

Mirror → **Signal** → **Manoeuvre**

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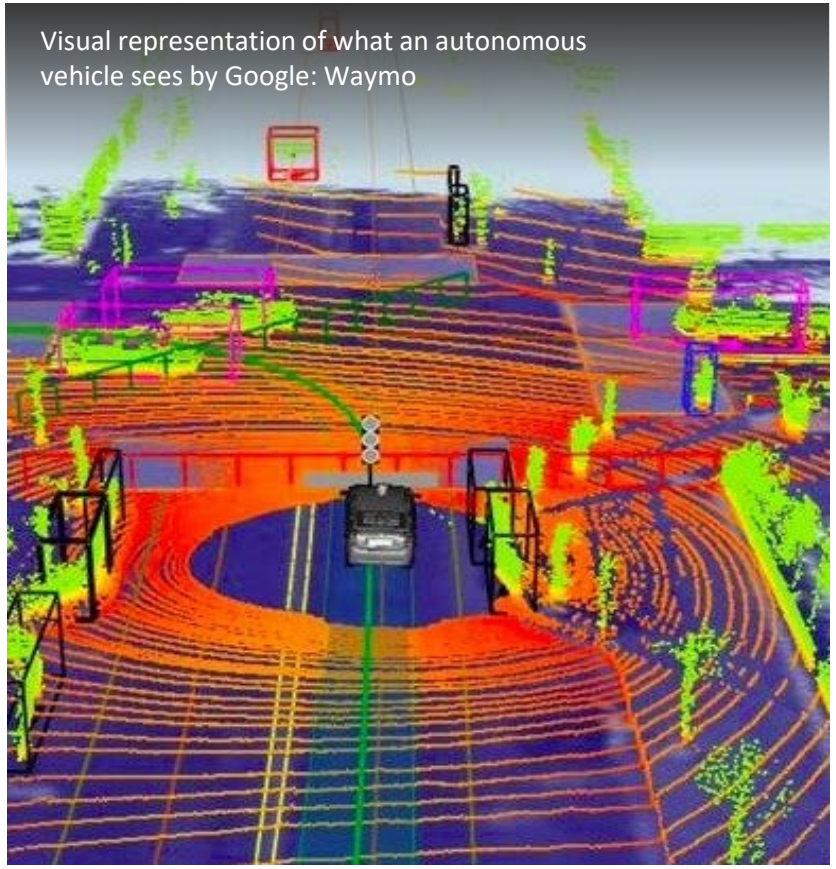
Computer driving a car

Sense	Decide		Act
Camera	Object classification	Path Planning	Brakes
Radar	Sensor Models		Steering
Lidar	Sensor Fusion	Driving Policy	Throttle
GPS	Environment Model		Lighting
V2X	Scene Understanding		Suspension



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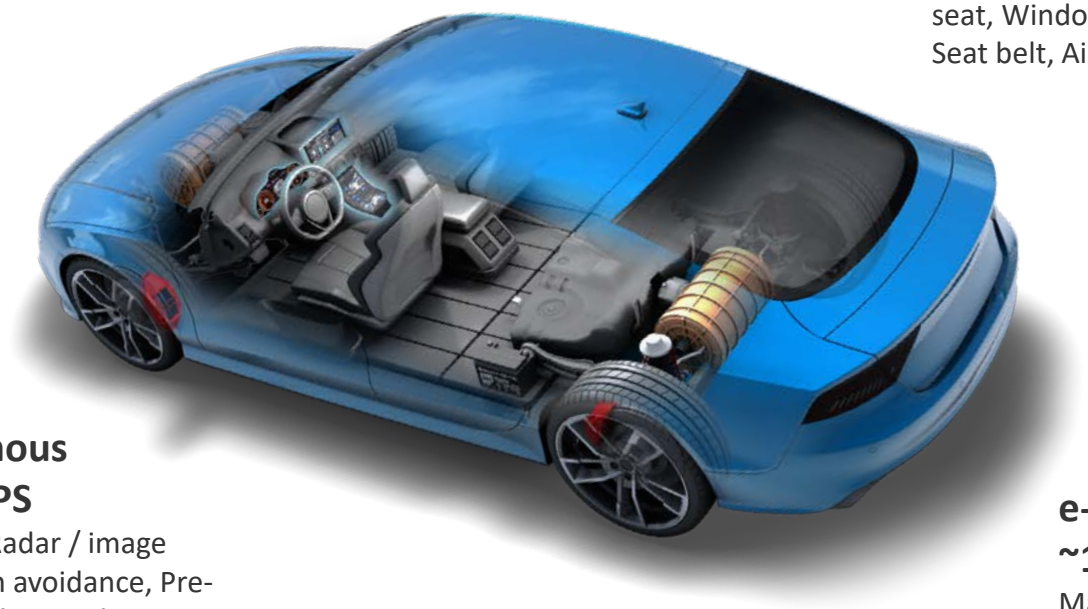
Automotive compute in 2020

Cockpit
~50,000 DMIPS
Audio Visual, Maps, Traffic, Toll payment, Google services
Rear entertainment, Voice recognition, Gesture control, Cluster and HUD

Connected Gateways
~20,000 DMIPS
LTE 5G, WiFi, Bluetooth connecting to CAN FD, LIN, Flexray, Ethernet

Body Electronics
<10,000 DMIPS
HVAC, Lighting, Doors, Electric seat, Windows, Mirrors, Cameras, Seat belt, Air bag, BCM



Semi Autonomous
~350,000 DMIPS
Level 3 autonomy, Radar / image processing, Collision avoidance, Pre-crash, Cruise control, Lane departure, Parking

Chassis
~15,000 DMIPS
EPS, ABS/EBS, Active VDC, EPB

e-Powertrain
~15,000 DMIPS
Main Motor control, Transmission, Engine control, Generator/E-water pump
Battery management

High-end smartphone
30,000-50,000 DMIPS
Main applications processor, WiFi, modem, sensors, etc.

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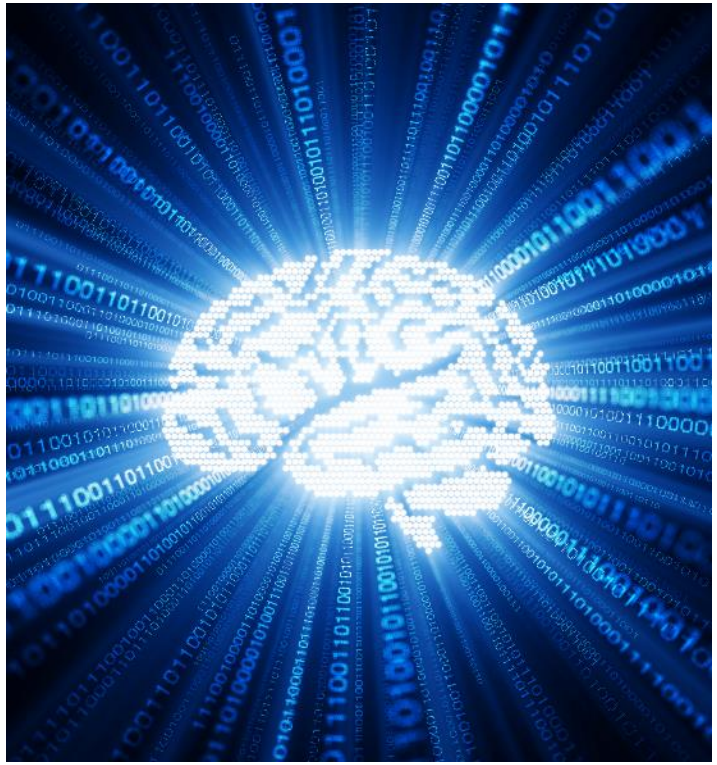
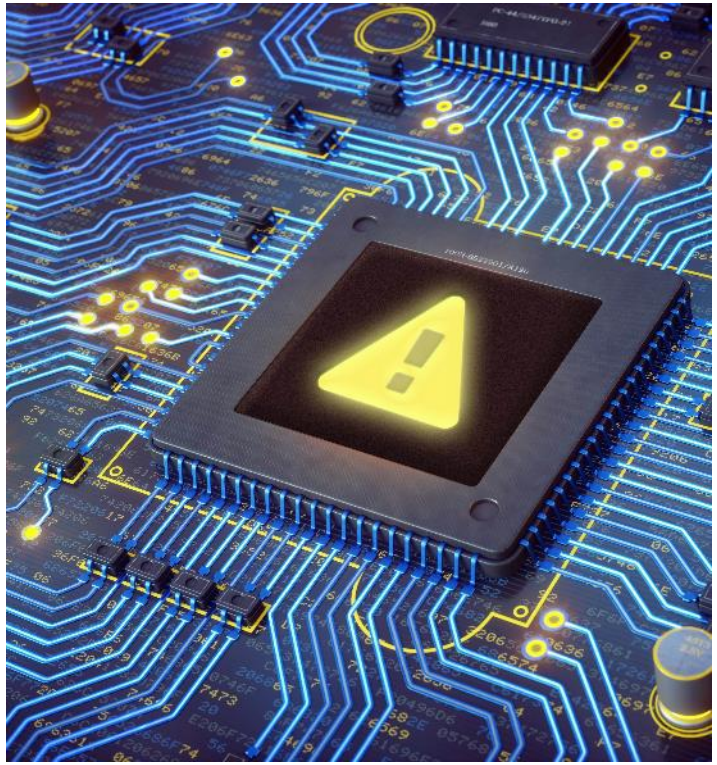
Technology challenges

Autonomous automotive



Functional safety requirements



Securing everything

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Timeline for autonomous driving

2016	2018	2020	2025
	Advanced • Several control functions • Collision Avoidance Steering (Low speed) • Advanced camera systems • CAN FD (10Mbps) • Sensor fusion	**HIGHLY AUTOMATED** • All-round collision avoidance • Limited automated driving • Ride sharing • Camera systems with 4k • Ethernet bus (1Gbps)	**AUTONOMOUS** • Start of fully automated driving • High speed all-round collision avoidance • Car sharing • Connected vehicle to vehicle • Interactive
Relative to 2016 Vehicles	20X performance 10X Data rate	40-50X performance 100X Data rate	100X performance 400x Data rate
Scalable processing solutions			

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Financing the future

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Investment philosophy

“Now is the time to be sowing, not harvesting”

- Rate of investment is discretionary and under Arm's control
- SoftBank has asked Arm to accelerate investments and to increase risk appetite
- All costs are expected to be financed from IP business’ revenue streams
- During this accelerated investment phase, costs are expected to grow faster than revenues

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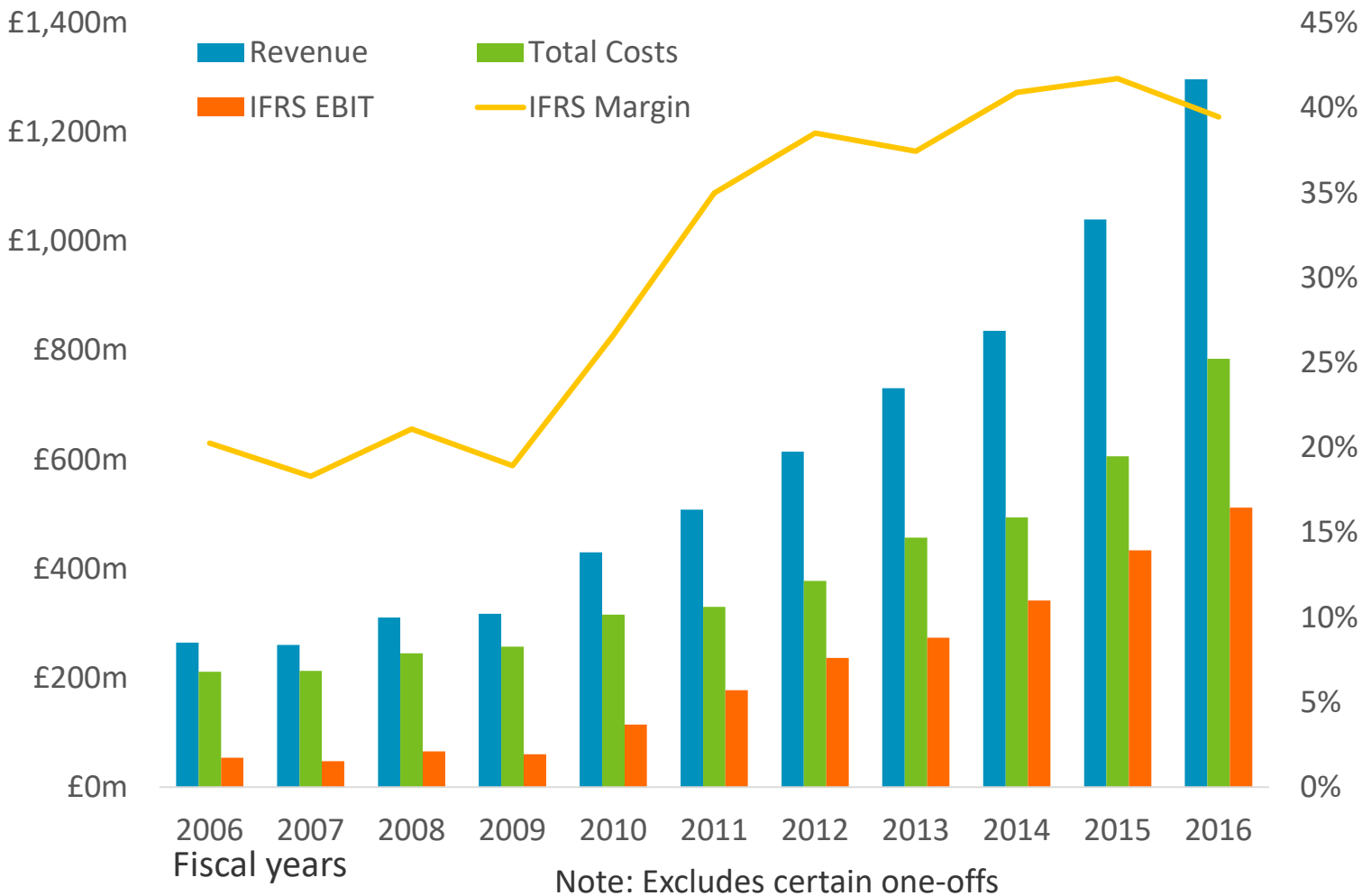
Revenues, profits and profitability



Over the past 10 years Arm's revenues grew faster than costs

In Q1 2017

- Revenues +2%
- Headcount +23%
- Costs +94%
- Profits -66%
- IFRS Margin 13%

Note: Excludes certain one-offs
- 2013: Write down of MIPS patents (£100m)
- 2016: Execution costs associated with SoftBank acquisition

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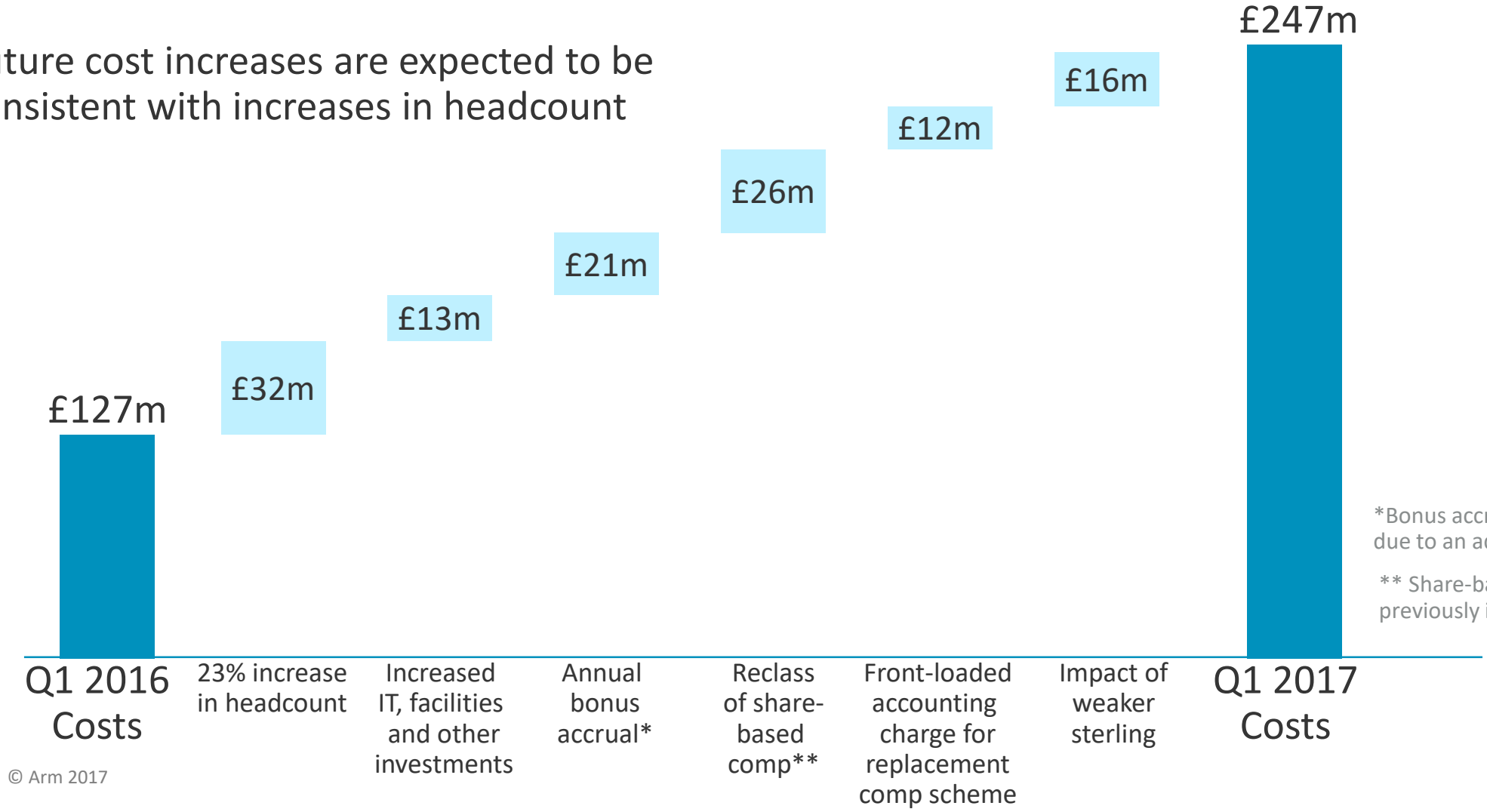
Investing in people, infrastructure to create new products

Costs were higher in Q1 2017 as Arm expands R&D capability

Future cost increases are expected to be consistent with increases in headcount



*Bonus accrual in Q1 2016 was small due to an adjustment in the quarter

** Share-based compensation was previously included in IFRS "other costs"

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Intangibles and Goodwill

Amortisation of Intangibles

Arm's intangibles have been valued at around £5bn / $6.5bn / ¥700bn

Amortised using a straight-line method over the useful life of the asset

Amortisation for first eight years will be around £370m per year ($93m per quarter)

Goodwill

Goodwill has been valued at around £18bn / $24bn / ¥2.7tn

Goodwill underpinned by Arm's 10-year plan

Goodwill impairment test annually and on trigger (any event where management changes view on Arm's opportunity)

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Thank You

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