



Arm Limited

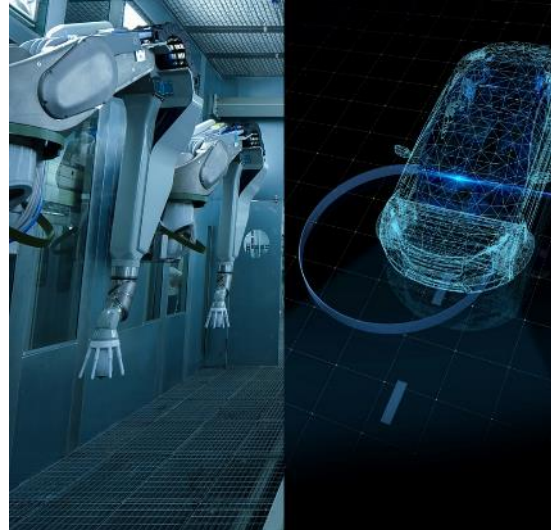
Q1 2018 Roadshow Slides

Arm Limited is a subsidiary of  SoftBank

Technology trends that will redefine all industries



Artificial Intelligence in every device



Autonomous machines



Augmented reality



Hyperscale cloud and connectivity



Security and Privacy

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	✓	✓	✓	✓

Arm introduction

Global leader in technology licensing

- R&D outsourcing for semiconductor companies

Innovative business model

- Upfront licence fee – flexible licensing models
- Ongoing royalties on partner sales
- Technology reused across multiple applications

Long-term, secular growth markets



>1,590 licences
Growing by >100
every year

**>510 potential
royalty payers**

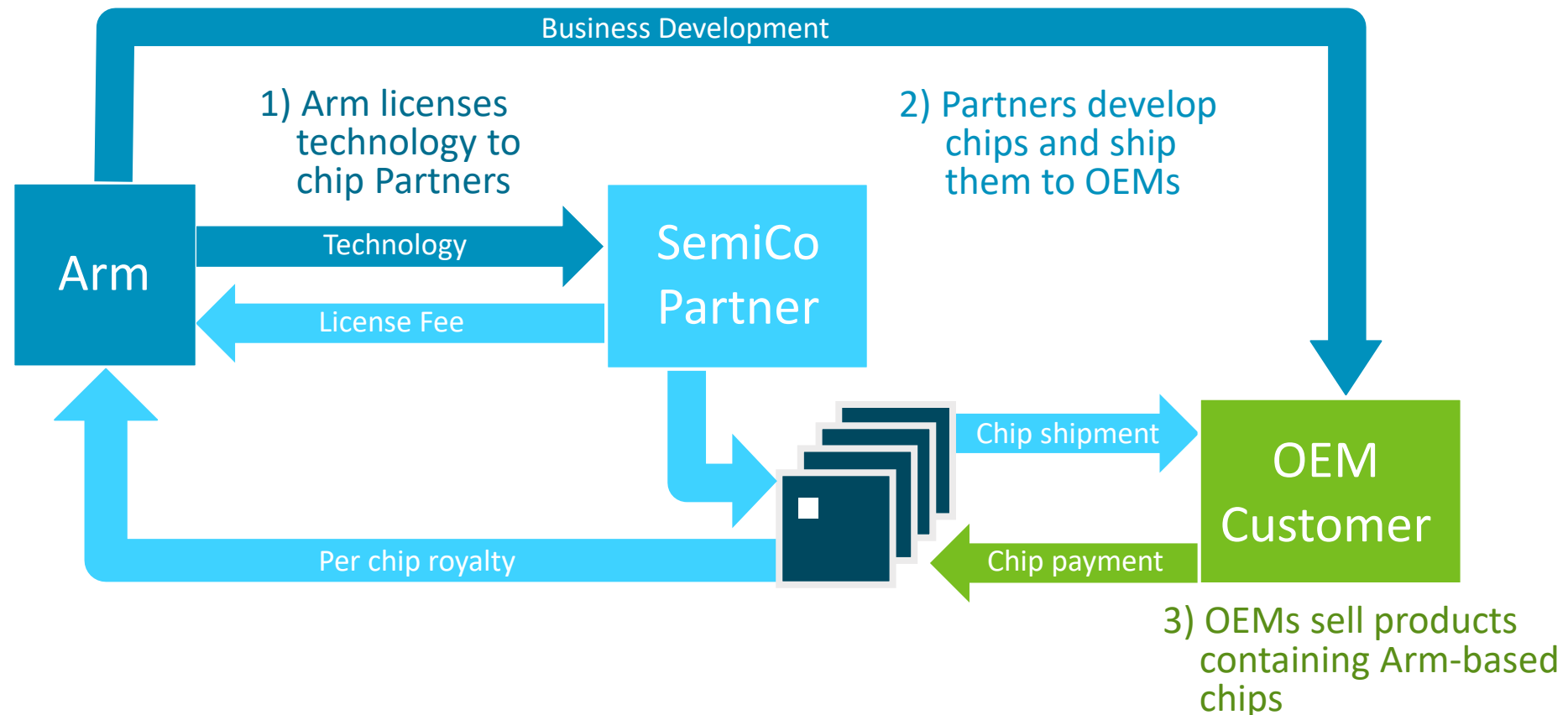
**>21 bn Arm-based chips
shipped in 2017**

**~15% CAGR over
previous 5 years**

Arm's business model

Arm develops technology that is licensed to semiconductor companies

Arm receives an upfront license fee and a royalty on every chip that contains its technology



Arm's strategy

Maintain or gain share in long-term growth markets

- From mobile phones to networking infrastructure and servers to embedded smart devices and automotive

Increase value of Arm technology per smart device

- Invest in developing more advanced processors with higher royalty rates
- Physical IP and multimedia IP further increase Arm's value per chip

Explore and exploit new opportunities in emerging applications created by the Internet of Things

Invest to create a sustainable business, fit for the long term

- Create superior returns by developing new technology that will deliver increased profits and cash generation in the future



Arm's main growth markets

Mobile and Consumer Devices



- Smartphones, tablets and laptops
- Apps processor, modem, connectivity, touchscreen and image sensors
- Growth coming from higher-value Arm technology such as Arm v8-A, octa core, multimedia

Networking & Servers



- Base stations, routers, switches, and servers for cloud and data centres
- Networks evolve to cope with increased data at lower latency: virtualisation, integration and programmability
- Most major chip vendors have announced Arm-based products

Embedded Markets



- Automotive, white-goods, wearables, smart devices in industrial and utilities
- Microcontrollers, smartcards, embedded connectivity chips
- 300 companies have licenced Arm processors for use in embedded computing devices

History of Arm

Joint venture between
Acorn Computers and Apple



1990

Designed into first mobile
phones and then smartphones



1993 onwards

Now all electronic devices can
use smart Arm technology



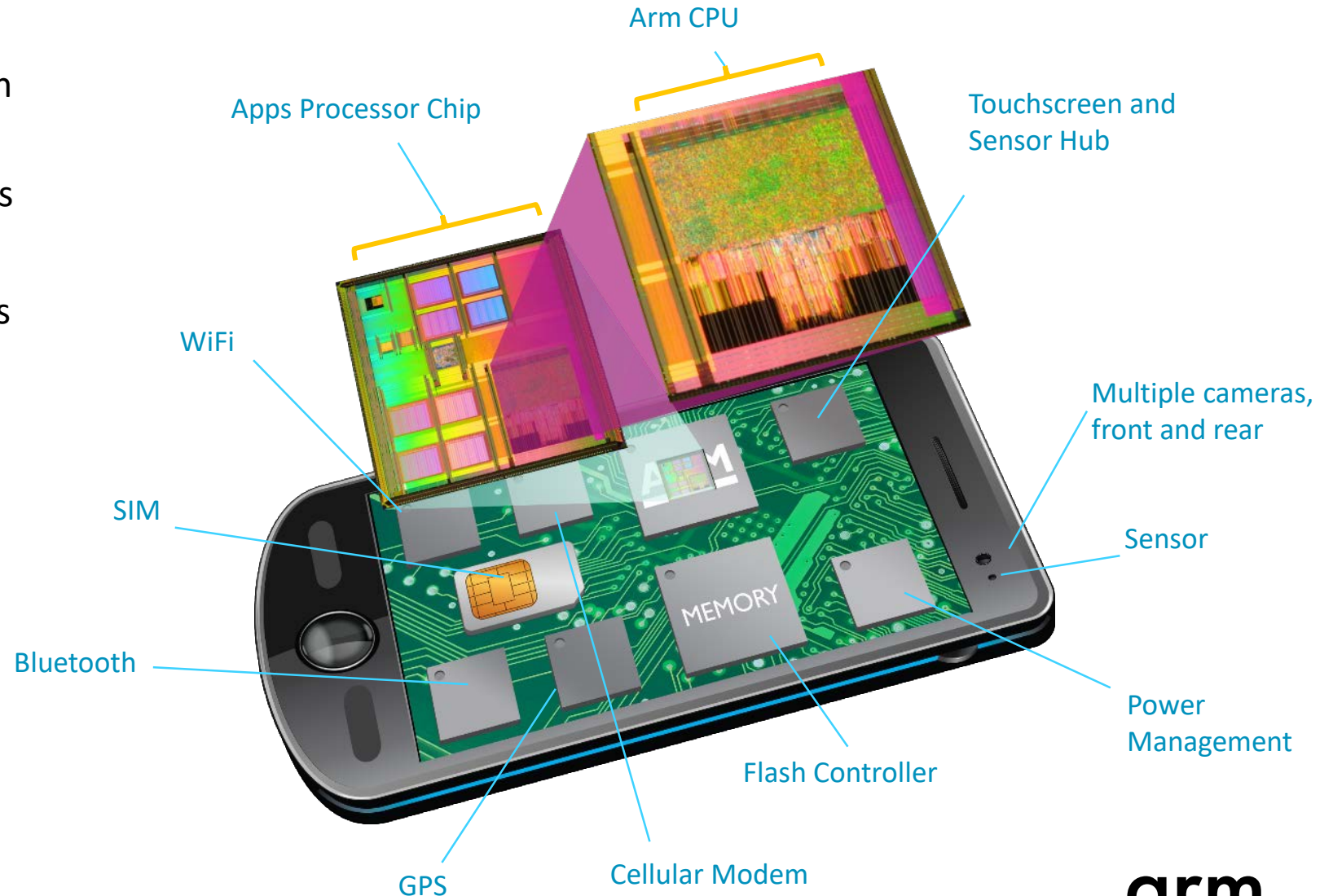
Today

Smart devices contain many Arm processors

Applications Processor chips can contain multiple Arm technologies

- Arm v8-A processor for OS and apps
- Cortex-R controller for modem
- Cortex-M controllers for peripherals
- Arm Mali multimedia processors: GPU, video, display, camera, etc.
- Arm physical IP

When new functions are added to smartphones it creates opportunity for new Arm IP



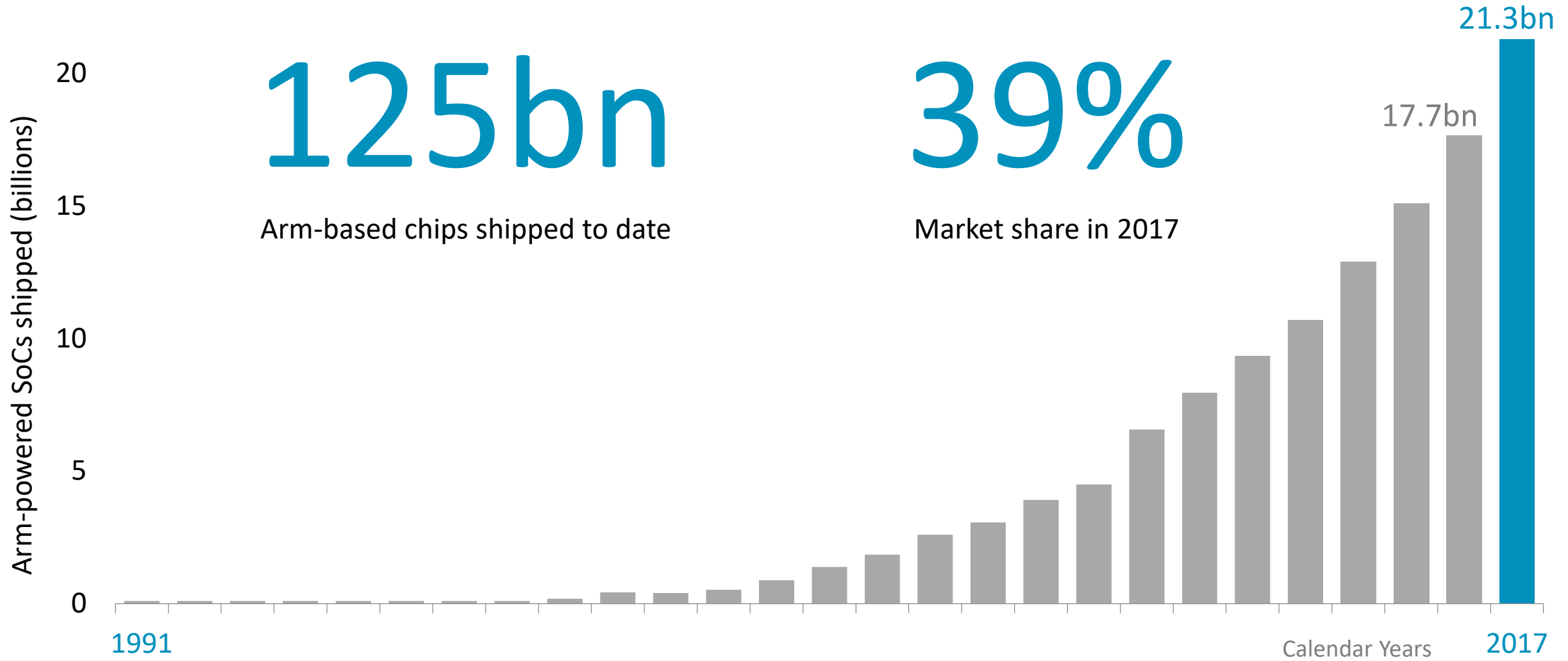
Arm-based chip shipments

125bn

Arm-based chips shipped to date

39%

Market share in 2017

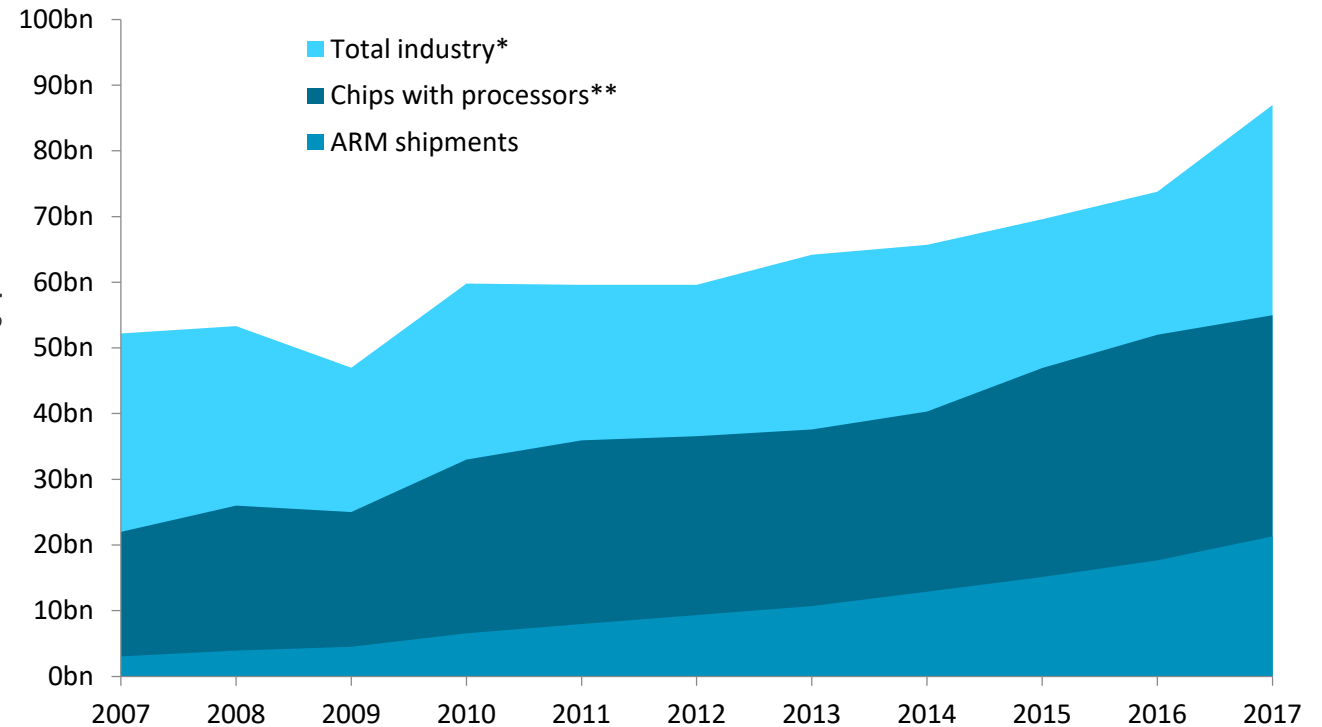


Arm's opportunity continues to broaden

Semiconductor industry continues to grow:
8% by volume, 3% by value over past five years

Proportion of chips with processors is increasing
over the medium term: 65% in 2017

Arm is gaining share within the “chips with
processors” segment of the industry:
39% in 2017



* Data source: WSTS, April 2018 and Arm,
Industry volume excluding analog and memory

** Arm estimates

Calendar years

From revenue to profits

FY 2017 Revenues	\$m	£m	%revs	
Licensing	618	455	33%	←
Royalty	1,087	819	60%	←
Software and Services	126	94	7%	
Total	1,831	1,368	100%	
Costs (£m)		1,043		←
Adjusted EBITDA (£m)		325		←
Operating Margin		24%		←
Other expenses (£m)		180		←
IFRS EBIT (£m)		145		

Over 95% of revenues earned in US dollars
Royalties are a growing proportion of revenues
Cost increase as Arm accelerates investment in R&D for future product developments
10% move in \$/£ impacts profits by ~15% (forex impacts £ revenues <i>and</i> costs)
Operating margins will be lower than in recent periods as investments grow faster than revenues
Excludes amortisation of intangibles related to the acquisition of Arm by SoftBank

Qtr. ending June 2018 – Financial summary

Revenues (\$m)	Q1 2017	Q1 2018	Growth
Licensing	149	85	-43%
Royalty	250	261	4%
Software and Services	29	35	21%
Total (\$m)	428	381	-11%
Revenues (£m)			
Revenues (£m)	329	281	-15%
COGS (£m)			
COGS (£m)	18	24	33%
R&D (£m)	134	145	8%
SG&A (£m)	95	111	17%
Costs (£m)	247	280	13%
Adjusted EBITDA (£m)	82	1	-99%
Other operating expenses (£m)			
Depreciation & amortisation	14	18	29%
Other operating expenses (£m)	25	-1,090	
IFRS EBIT (£m)	43	1,073	

Licensing can fluctuate quarter to quarter. In Q1, lower revenues are primarily due to contract delays as Arm China was established.

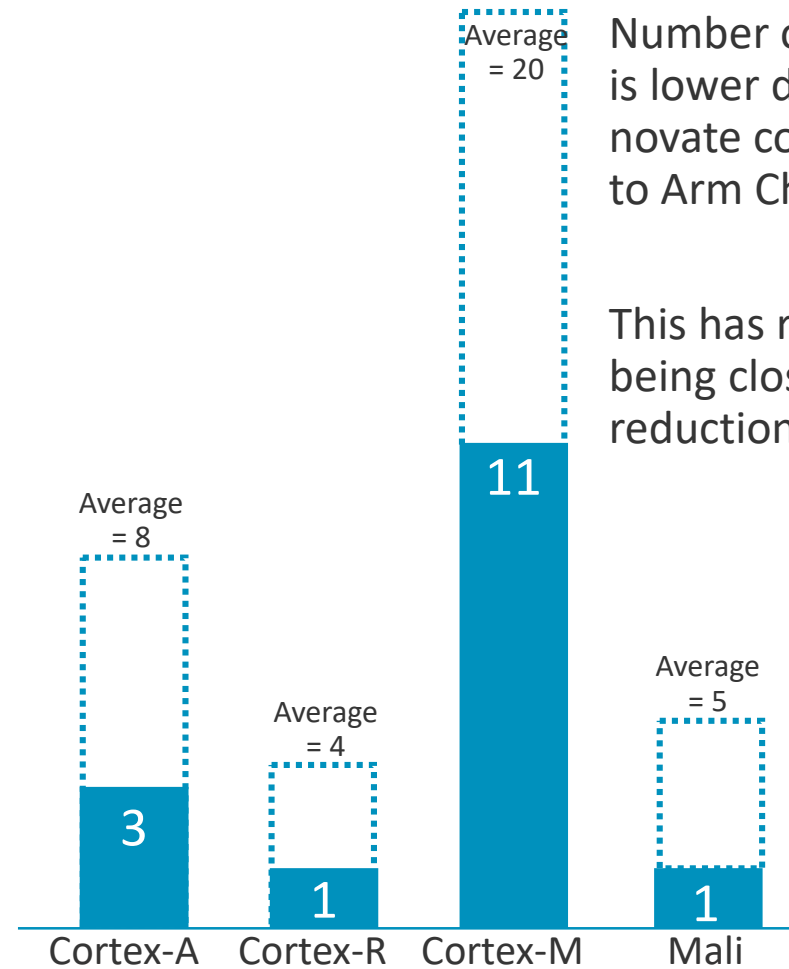
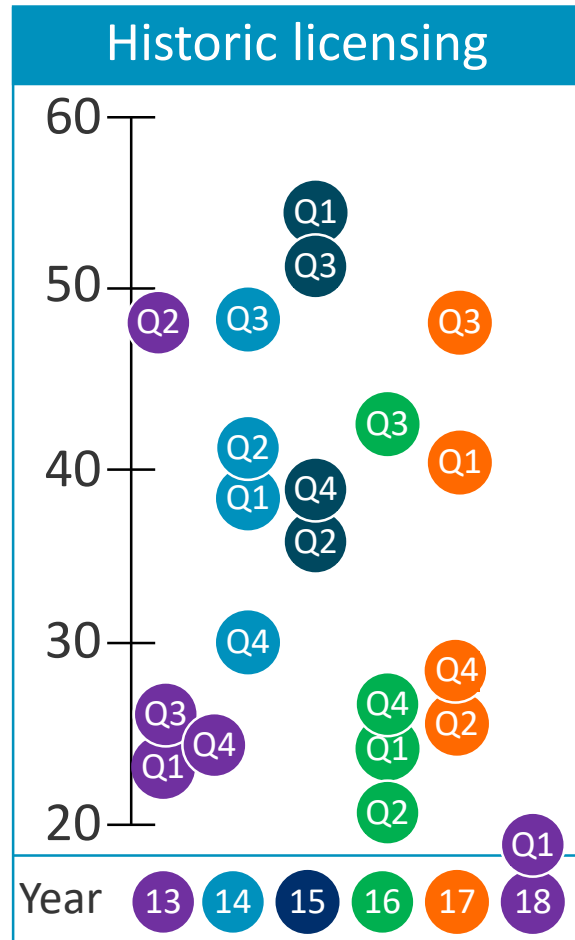
Royalty revenue growth driven by market share gains and increasing royalty per chip

USD weakened versus sterling in past year (1.30 vs 1.36)

10% increase in total headcount at end of Qtr
17% if Arm China is included

Revaluation of Arm China at \$1.5bn

Q1 Licensing: 16 is below the normal range



Number of licenses signed in Q1 2018 is lower due to Arm China needing to novate contracts from Arm Limited to Arm China.

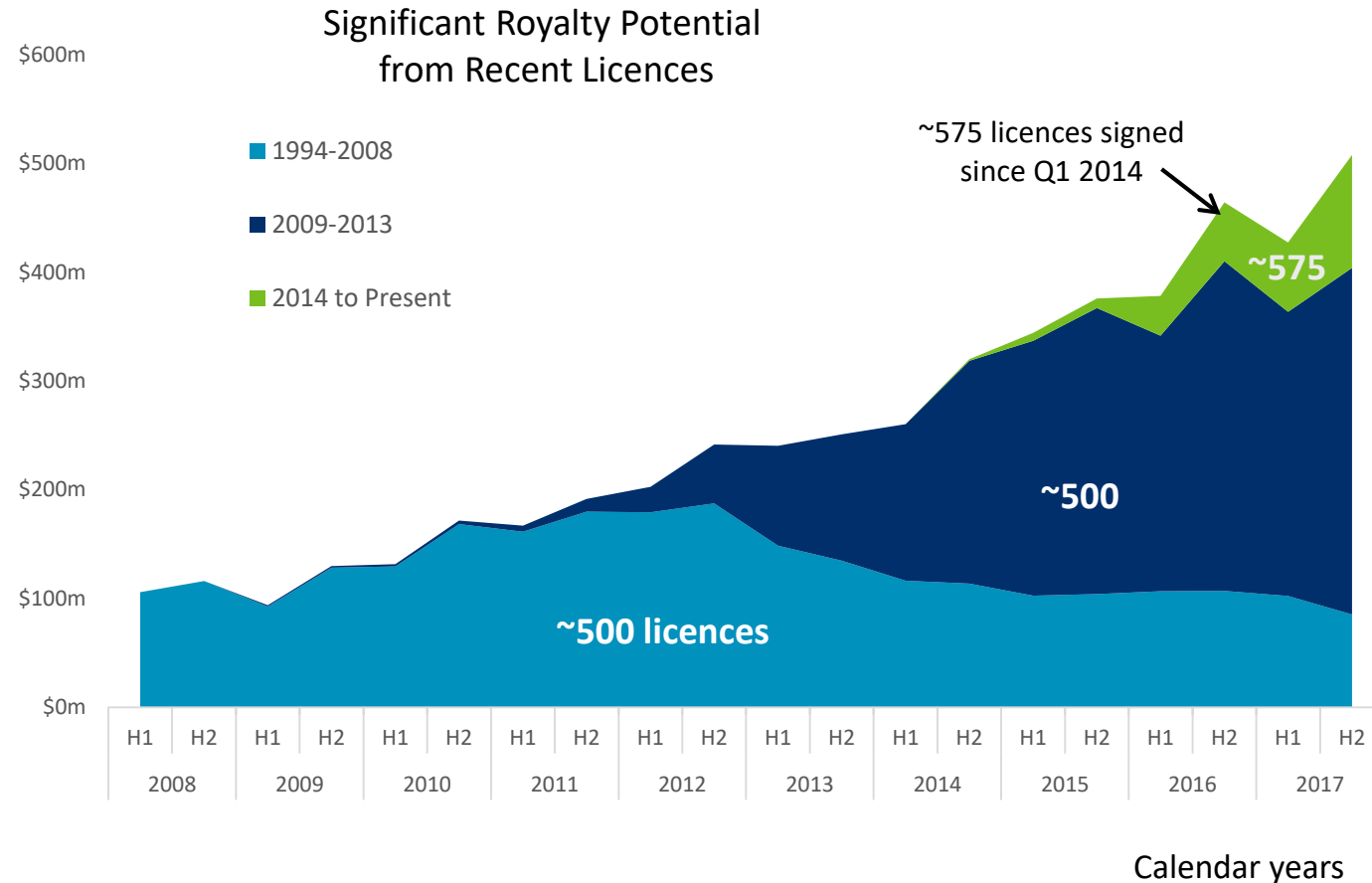
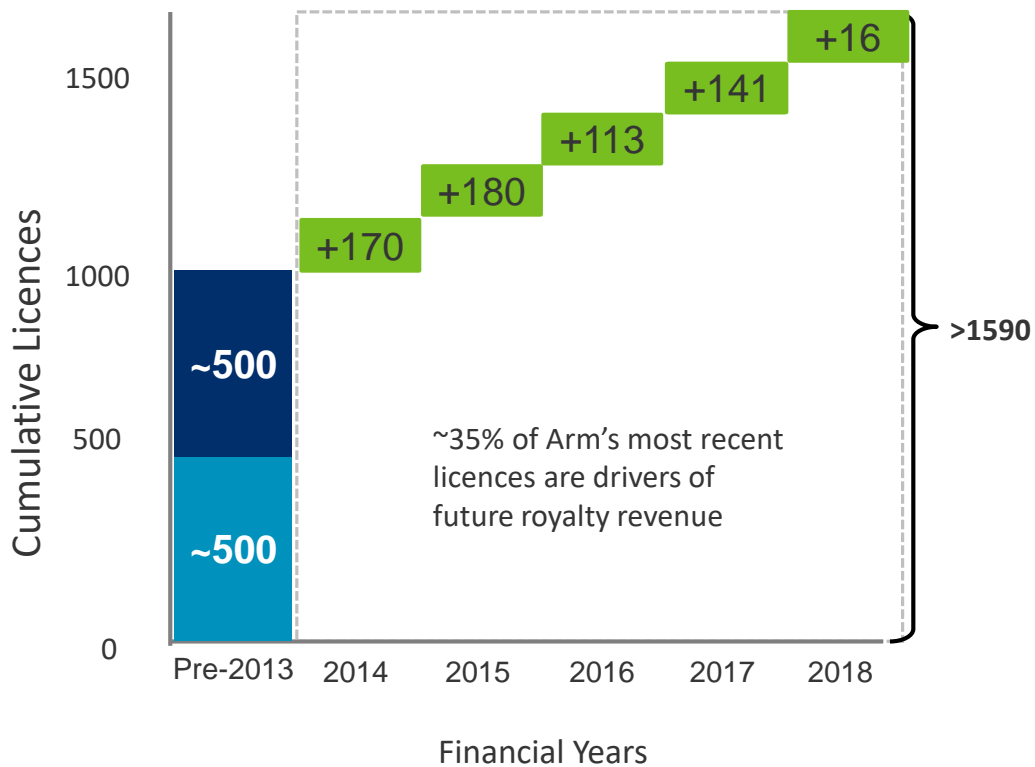
This has resulted in a delay to licenses being closed and we have not seen a reduction in demand for Arm technology.

Licensing enables future royalties

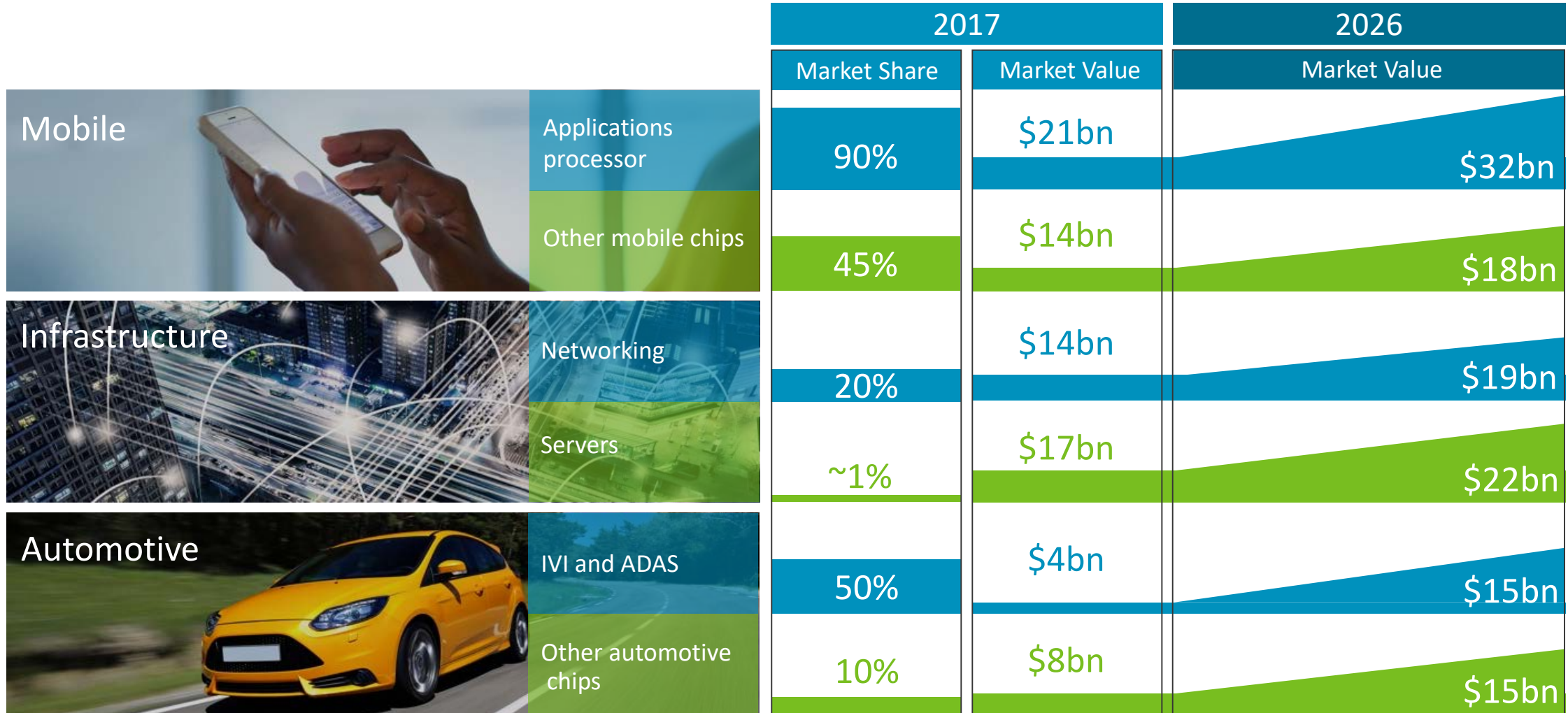
Arm signed 16 licences Q1 2018

Arm's current royalty revenues are derived from licences signed many years ago

Growing base yields royalty revenues over long period



Arm's expanding opportunity



Arm's expanding opportunity



Embedded

- Controller in IoT Devices
- Microcontrollers/SIM Cards



Other Markets

- Consumer Electronics
- Other chips



Total Market

- All chips with processors (current TAM)
- All addressable chips (future TAM)

2017		2026
Market Share	Market Value	Market Value
90%	\$7bn	\$24bn
20%	\$17bn	\$21bn
40%	\$21bn	\$27bn
40%	\$7bn	\$10bn
39%	\$130bn	\$200bn
25%	\$165bn	\$220bn

Establishing Arm China JV in Fiscal Q1 2018

Building a bigger business; built on strong foundations

>150

Licensees

10bn

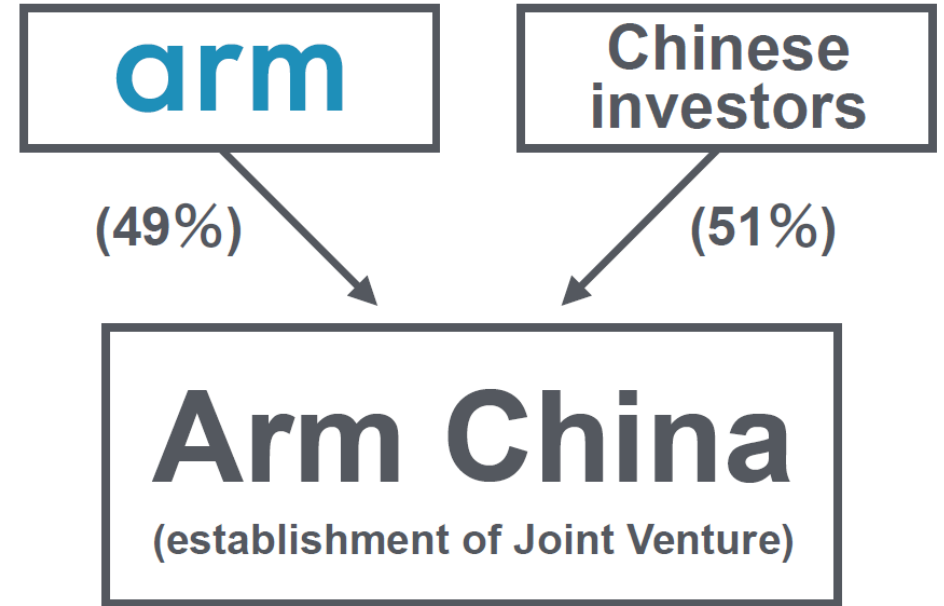
Chips shipped by Chinese partners using Arm processor technology

95%

Chinese designed SoC based on Arm processor technology

x140

Growth in volume shipment by Chinese partners 2006-2017



Arm China will be able to better access new local technology opportunities, especially in server, smart meter/grids and IoT

Establishing Arm China JV in Fiscal Q1 2018

Building a bigger business; built on strong foundations

>150

Customers to novate from
Arm Limited to Arm China

341

Employees transferred
to Arm China in Q1

~20%

Arm's revenue came from
China in 2017

10-20

Licenses signed in a typical
quarter with Chinese customers

Arm China JV establishment was initiated in early Q1 2018 and completed at the end Q1

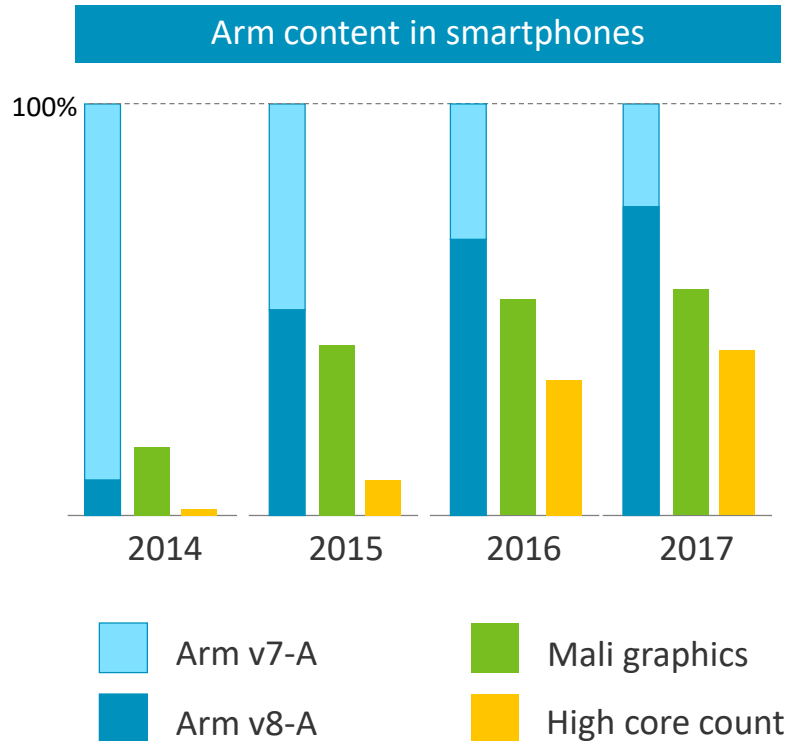
Novation (transfer) process of historical contracts resulted in a delay to contract signing in the current quarter

In Q1 only four new contracts were added with Chinese companies

Arm's opportunity in mobile and consumer

Continued growth from advanced technology and new form factors

Growth has been driven by advanced Arm technologies

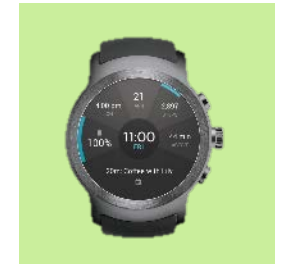


Consumers pay a premium for performance and features



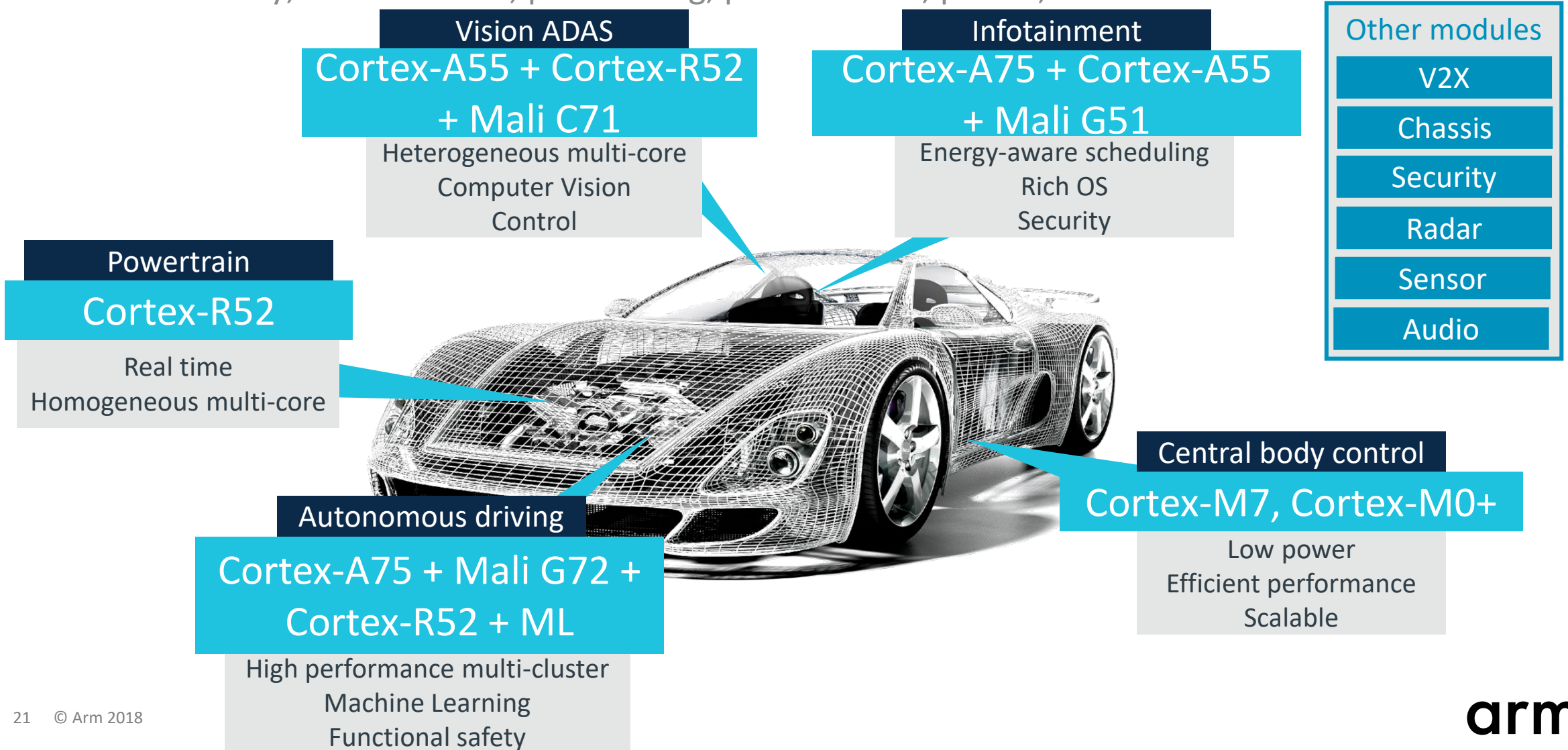
\$60 of Arm-addressable chips in the latest high-end smartphones

Investment in smartphones has led to new form factors



Arm's opportunity in automotive

Functional safety, consolidation, partitioning, performance, power, cost



Arm's opportunity in servers

Targeting 25% share (~1% share today)

Arm processors are suitable for >50% of data centre workloads

Microsoft has ported the core components of Windows Server onto Arm



- Search and Indexing
- High-performance storage
- Machine learning and big data
- Web servers, database servers
- Email, PaaS services

Arm v8-A selected for High Performance Computing

Barcelona Supercomputer Centre selects Arm v8-A for Mare Nostrum 4



Fujitsu and RIKEN select Arm v8-A for the Post-K supercomputer



Now shipping into enterprise applications

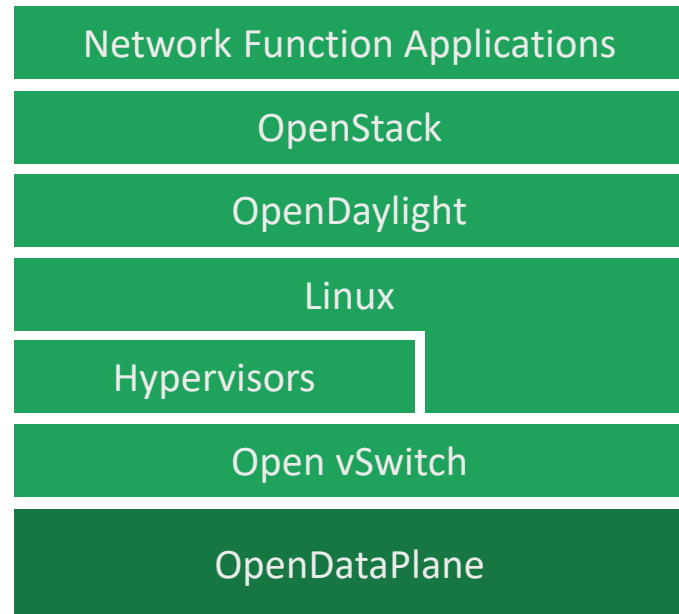
Arm v8-A server chips are shipping in volume into storage appliances.



Arm's opportunity in networking

Targeting >50% share of chips in next-generation networks

Future networks will be based on open source collaboration



Networking software is being optimised for Arm-based chips

OpenDataPlane project members



Accelerating data comms from server to server



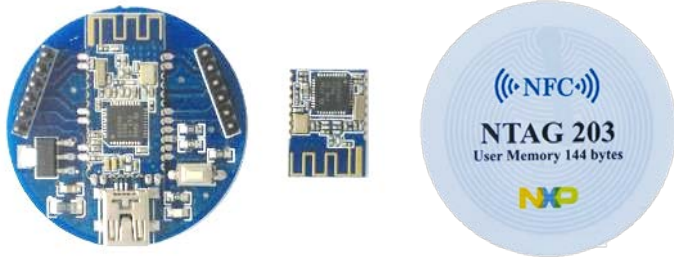
“When you offload to hardware, you run roughly a tenth the latency, a tenth the power, a tenth the cost. Here’s some great news: we’re in the semiconductor business!”

James Hamilton, VP and Distinguished Engineer, AWS

Arm's opportunity in IoT – silicon IP

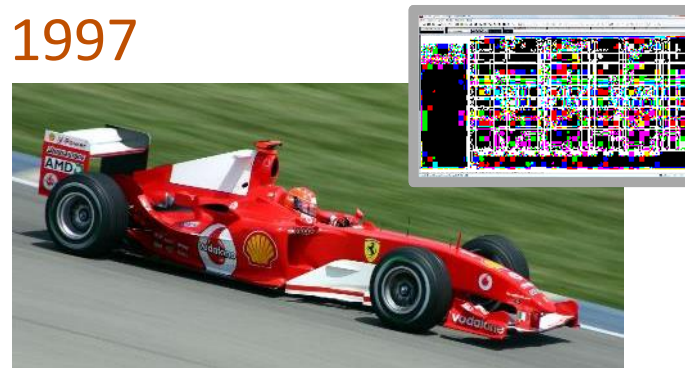
The architecture of choice for IoT developers

Cortex-M processors enable secure, low-cost IoT devices



High-value tech is now available at consumer price points

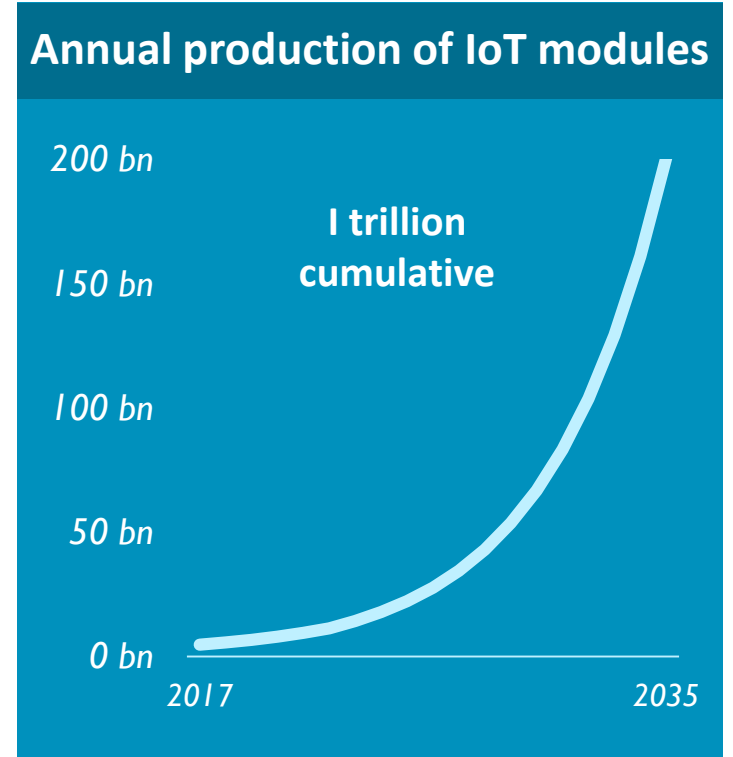
1997



2017



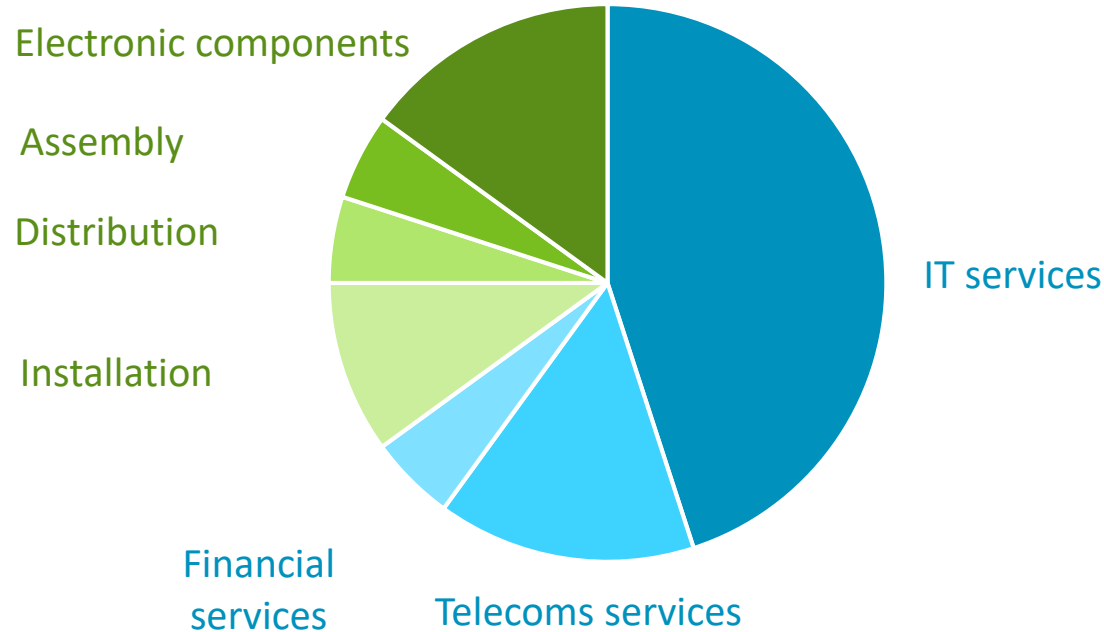
Every thing will be connected



Arm's opportunity in IoT – software and services

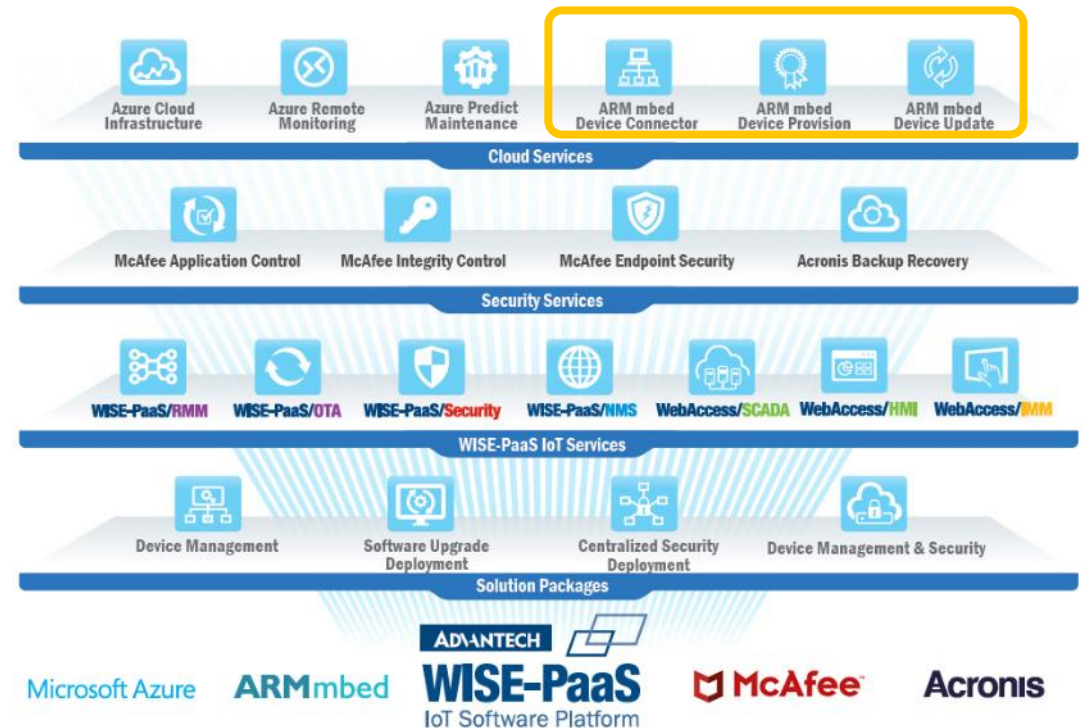
Investing to create new revenue streams

Arm forecasts a \$1 trillion TAM for IoT technology in 2035



The TAM refers to IoT technology (electronics, software, services) only, it excludes the value of the 'things' that contain the IoT modules

Arm's IoT platform is being integrated into OEM lifetime management services



Artificial intelligence in every device

Learning in the cloud, inference at the edge

Mobile



Automotive



Robotics



Drones



IoT



Home, surveillance & analytics



VR/MR



Shipping & logistics



Machine learning and computer vision

The key workloads for intelligent computers

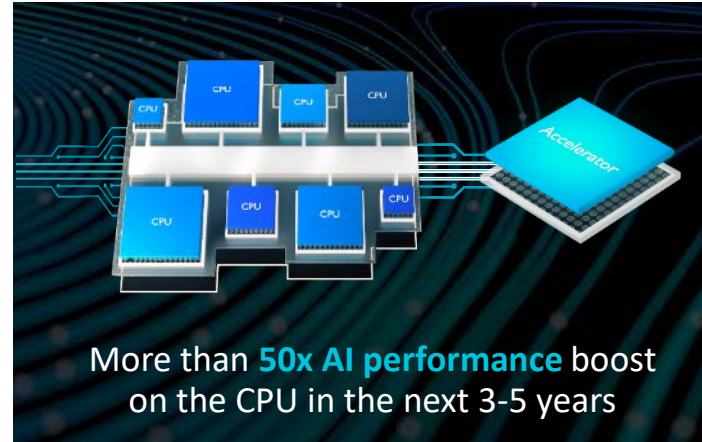
Widely-available software tools give developers access to ML



arm COMPUTE LIBRARY



Optimise for performance, cost and programmability



arm DynamIQ

The latest Arm v8-A CPUs implement new instructions for ML calculations, and increase the memory bandwidth between CPUs and accelerators.

Stable algorithms can be hardwired into accelerators



arm Project Trillium

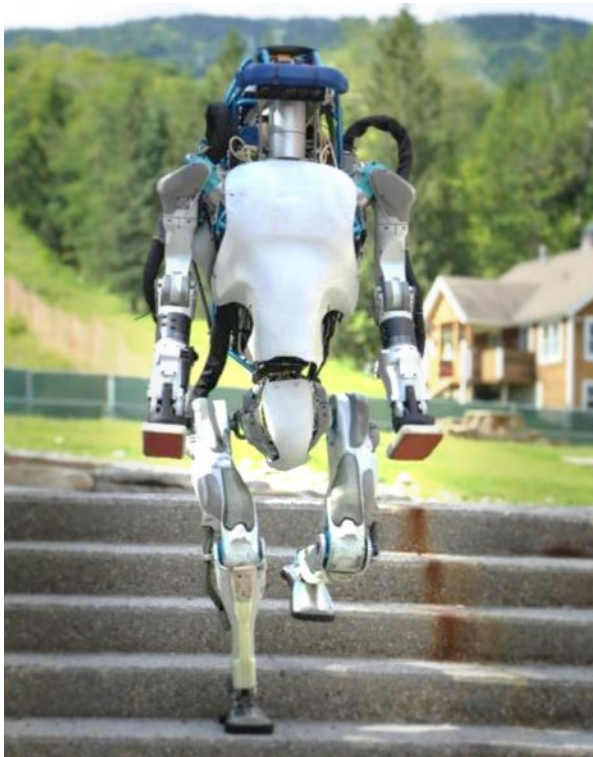
Arm's Project Trillium includes accelerators for Machine Learning and Object Detection and optimised libraries for Neural Networks. It is up to 80x more efficient than a typical DSP implementation.

arm

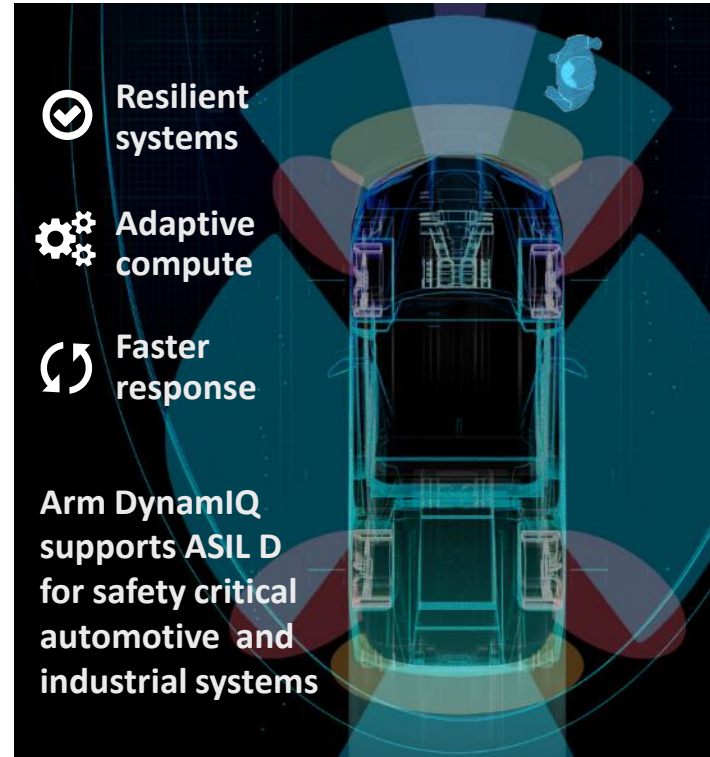
Autonomous machines

Advanced compute is moving to the physical domain

Robots and autonomous cars will operate alongside people



The physical domain requires stringent safety standards



Vehicle electrification will force the pace of change



- All future models from Volvo will have electric or hybrid engines
- UK and France have announced plans to phase out petrol vehicles by 2040

Augmented reality

New experiences and new user interfaces

Seamless interactions between humans, machines and data



Augmented reality (AR) overlays digital information onto the user's view of their immediate surroundings.

AR relies on advanced display technologies and new techniques for reading user input, such as 3D sensors.

A demanding roadmap for mobile GPU performance



Latency: <16ms

to avoid motion sickness

Frame-rate: >60 Hz

for a smooth viewing experience

Resolution: 2K minimum

for realistic images

Driving innovation in displays, 3D sensors and computer vision



Source: Sony

Hyperscale cloud and connectivity

Infrastructure for the information revolution

Enterprise compute is moving to the cloud

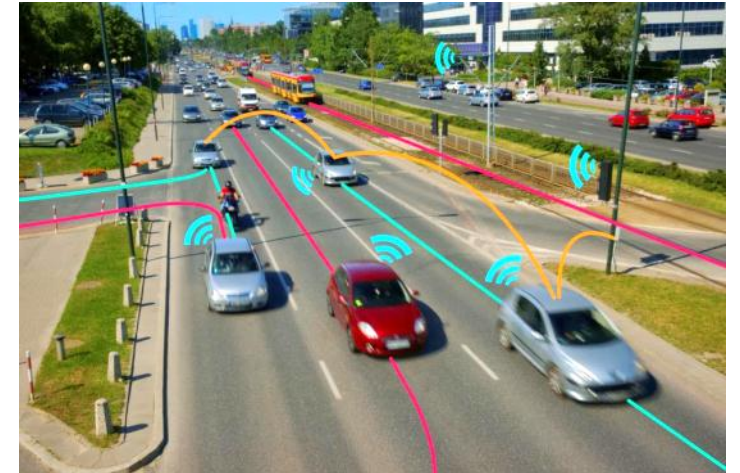


Insatiable demand for data is driving new standards

Performance targets for 5G networks

- **1000x** data volume per km²
- **1000x** connections per km²
- **100x** user data rate
- **80%** reduction in latency
- **80%** reduction in opex
- **90%** reduction in energy

Workloads will be shared across devices, base stations and servers

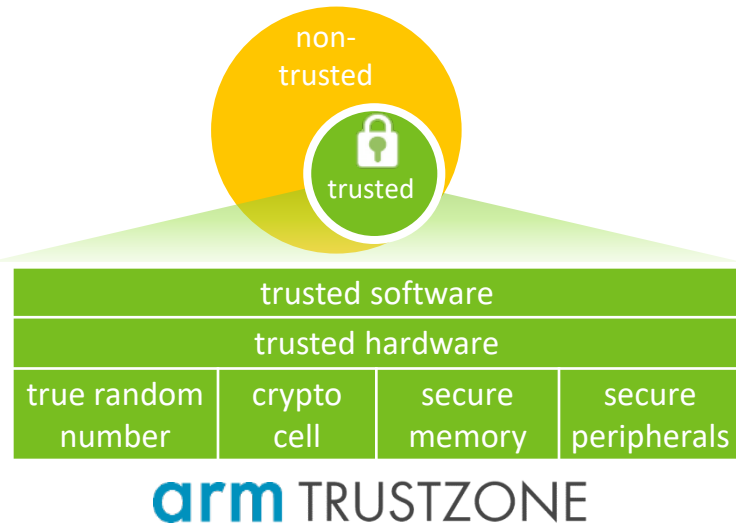


Autonomous vehicles will be controlled by computers in the car, in neighbouring cars, in nearby base stations and in remote datacentres

Information security

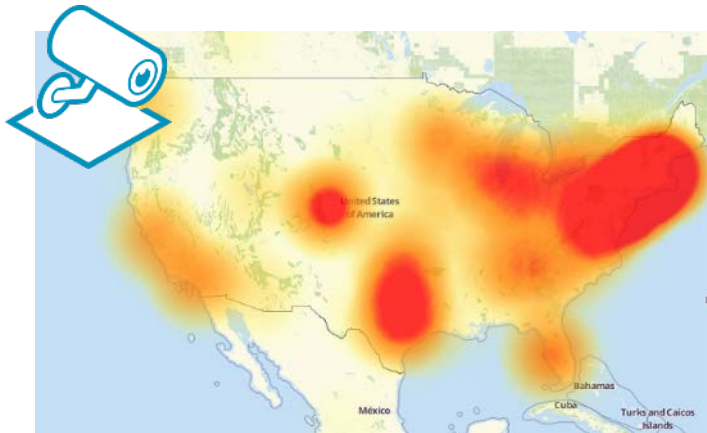
The fundamental component of all connected systems

Secure systems are built on a hardware root of trust



- Secure Identity – Software Identity –
- Secure Boot – Isolation – Authentication –
- Encryption – Tamper Detection –
- Trusted Execution Environment –

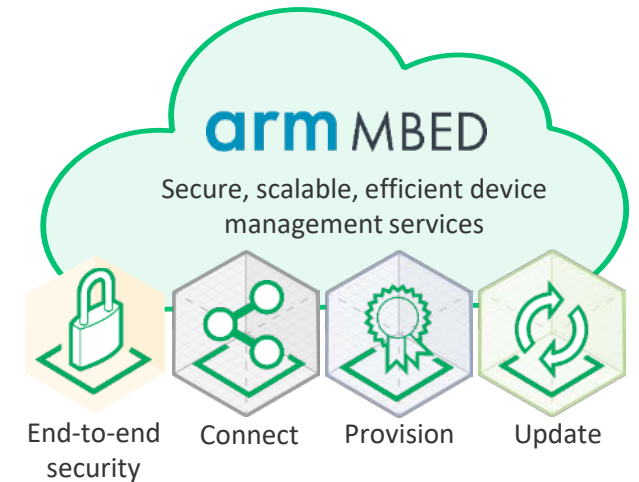
Devices must be kept secure with regular software updates



Chinese OEM to recall up to 10,000 webcams after hack

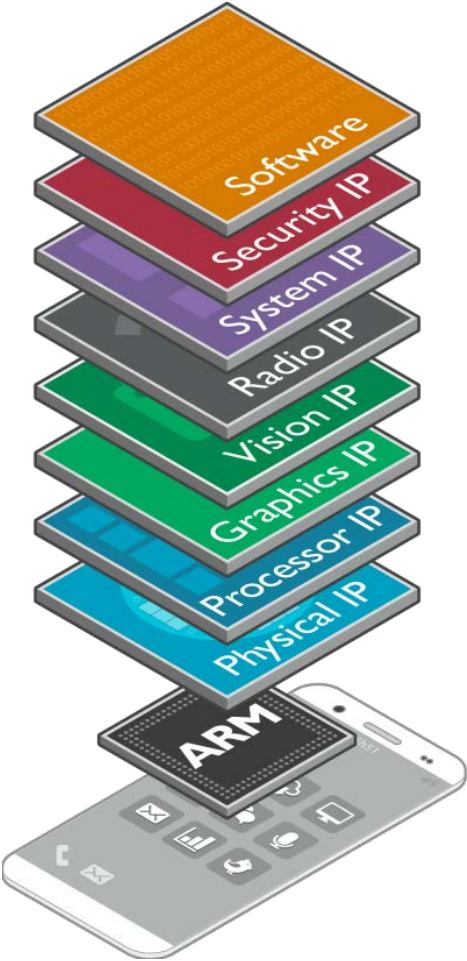
Mirai Botnet attack, October 2016

Good security is inexpensive to implement and costly to crack



Arm Mbed Cloud takes care of complex security tasks in large-scale IoT networks. This allows Arm's OEM customers to concentrate their development on features that differentiate their product offering.

Arm's current business



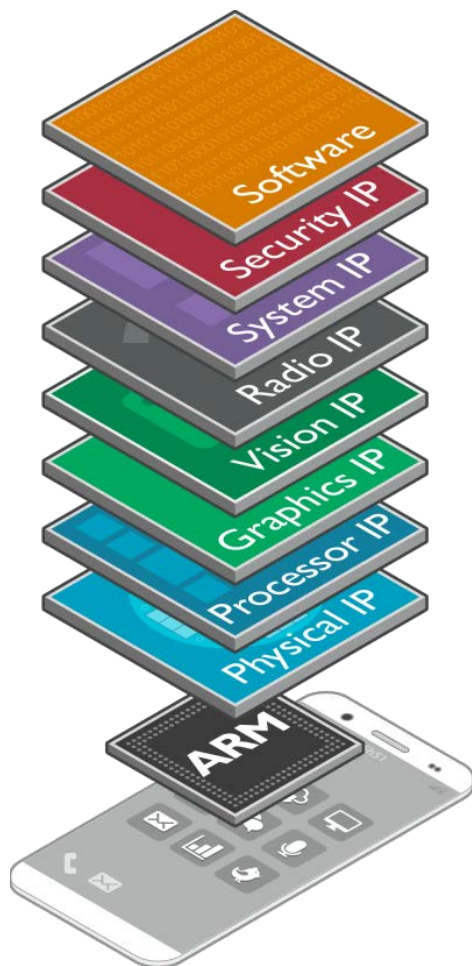
Arm develops **intellectual property** (IP) blocks which are used in silicon chips

Our partners combine Arm IP with their own IP to create complete chip designs

We earn **license fees** when we deliver Arm IP to our partners and **royalties** when our partners ship chips that contain Arm IP

Highly **profitable and cash generative**

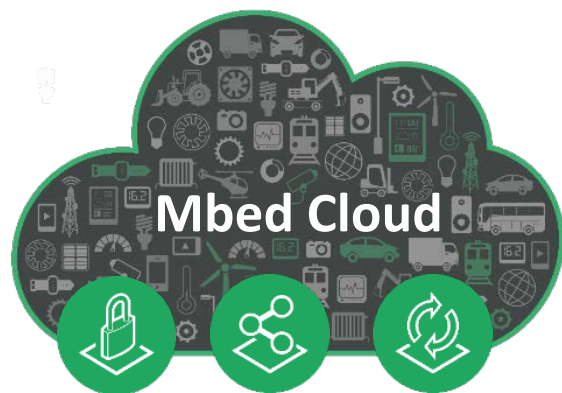
Accelerating investment to increase share gains



Generating profits and cash to be reinvested

Investing to create new revenue streams

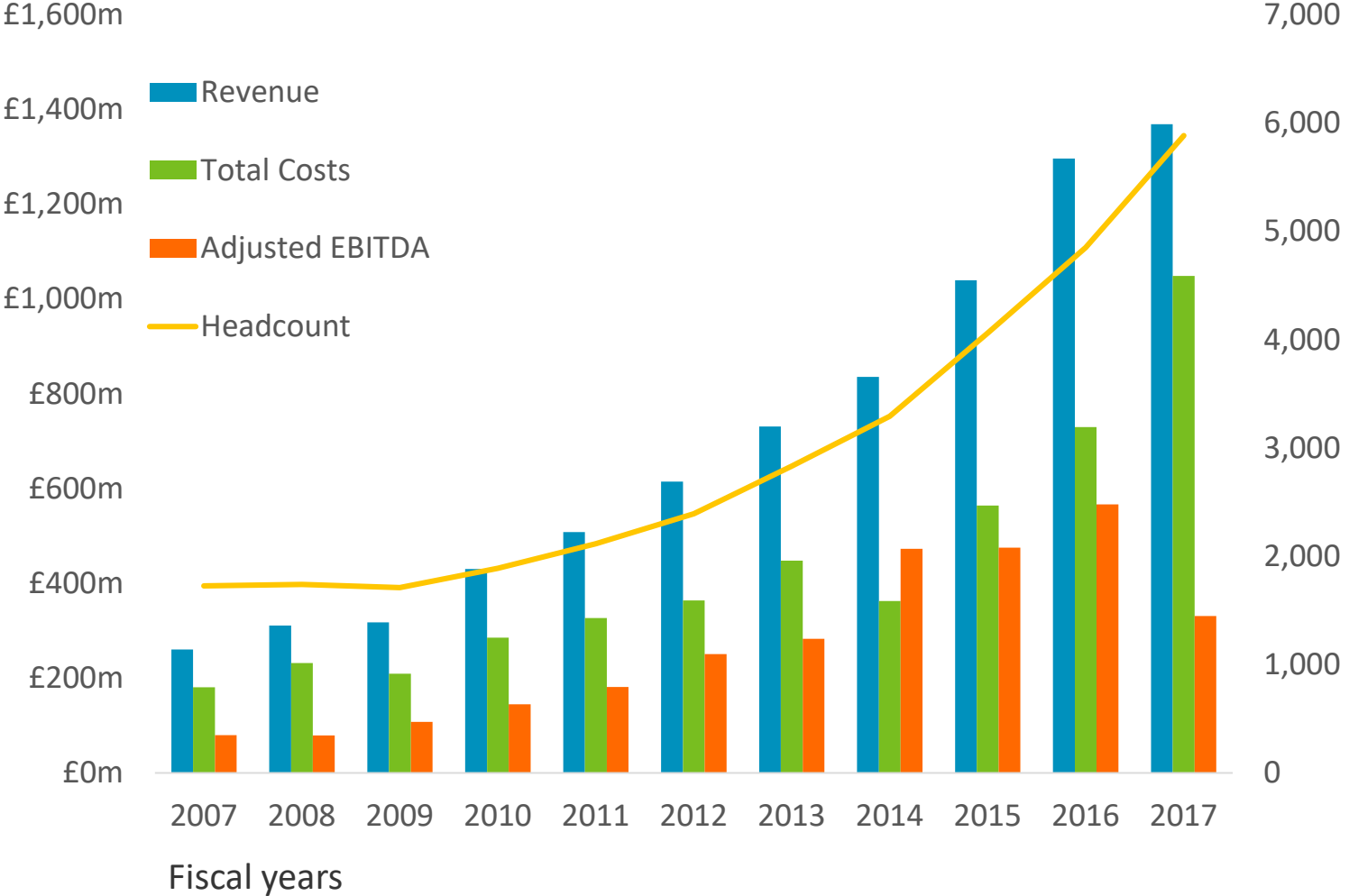
- Mbed Cloud SaaS business
- Early-stage investment but many years in research
- Securely connect and manage any device, using any communications technology, supporting any cloud platform
 - Device Management: secure device identification, on-boarding and configuring
 - Secure Connectivity: manage your IoT networking using standard-based comms
 - Data Management: Ingestion and aggregation of data



Mbed Cloud Partners



Revenues, investments and profits



Until 2016 revenues grew faster than costs as Arm constrained investment in R&D to enable increasing profits

For the current phase of investment Arm expects costs to grow faster than revenues

This should yield even greater profits in the future



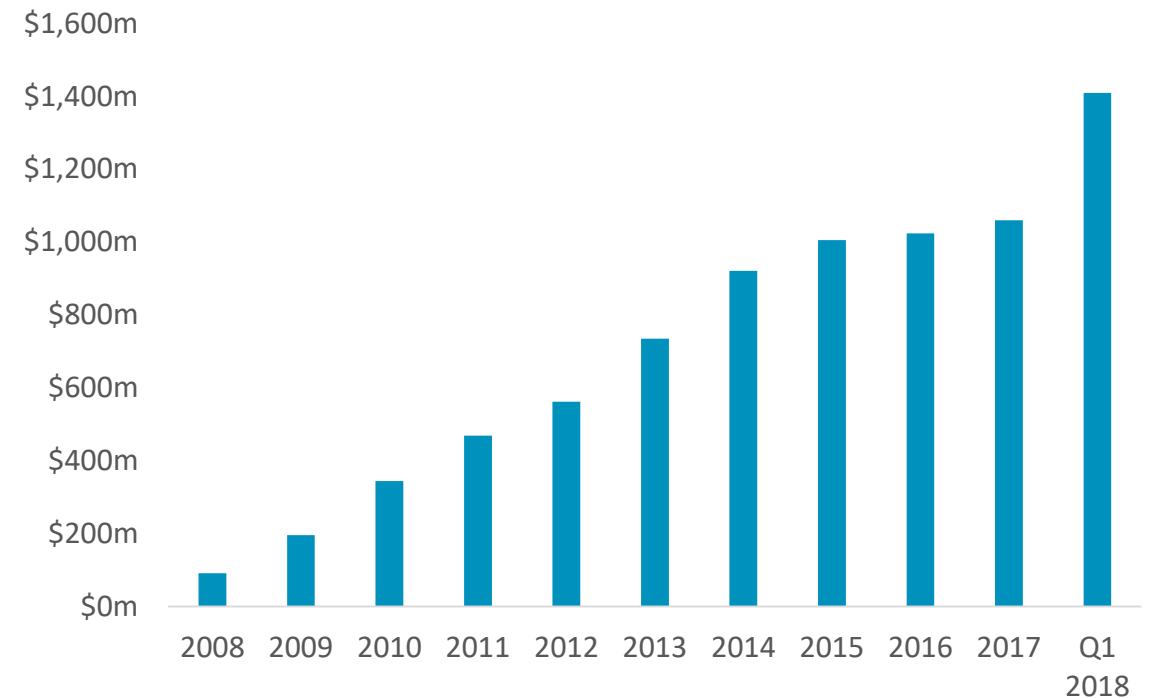
Investment philosophy

“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

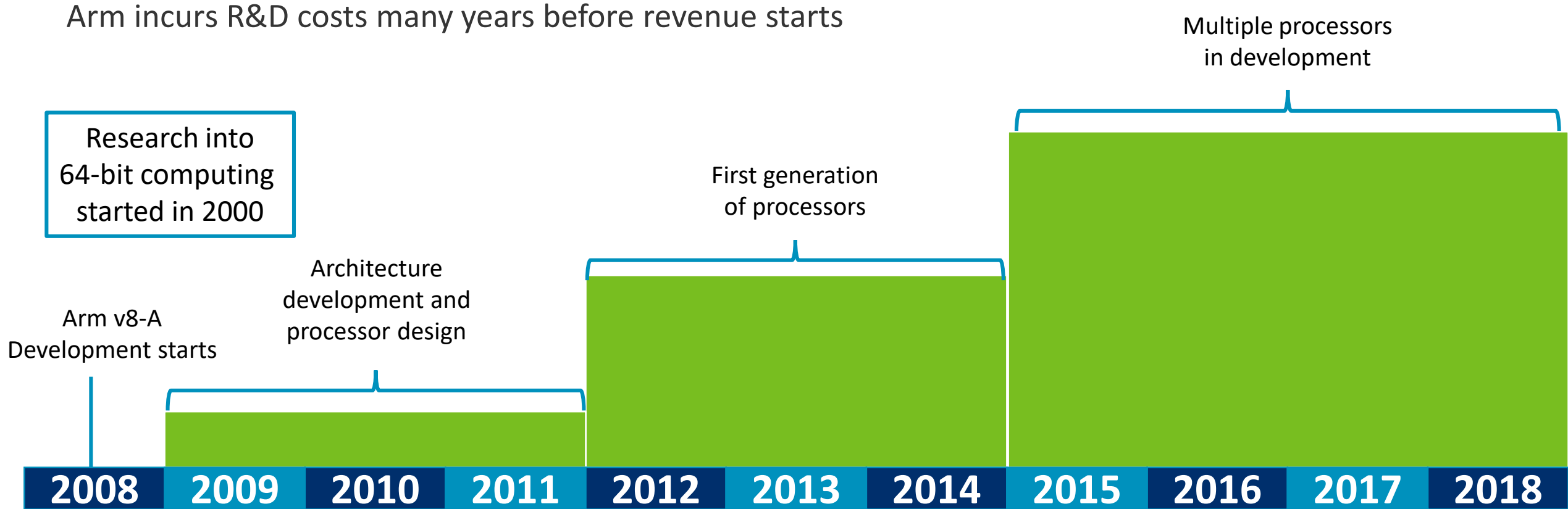
Arm has over £1.4bn of net cash and no debt

Increase in Q1 2018 is due to sale of Arm's stake in the Arm China Joint Venture



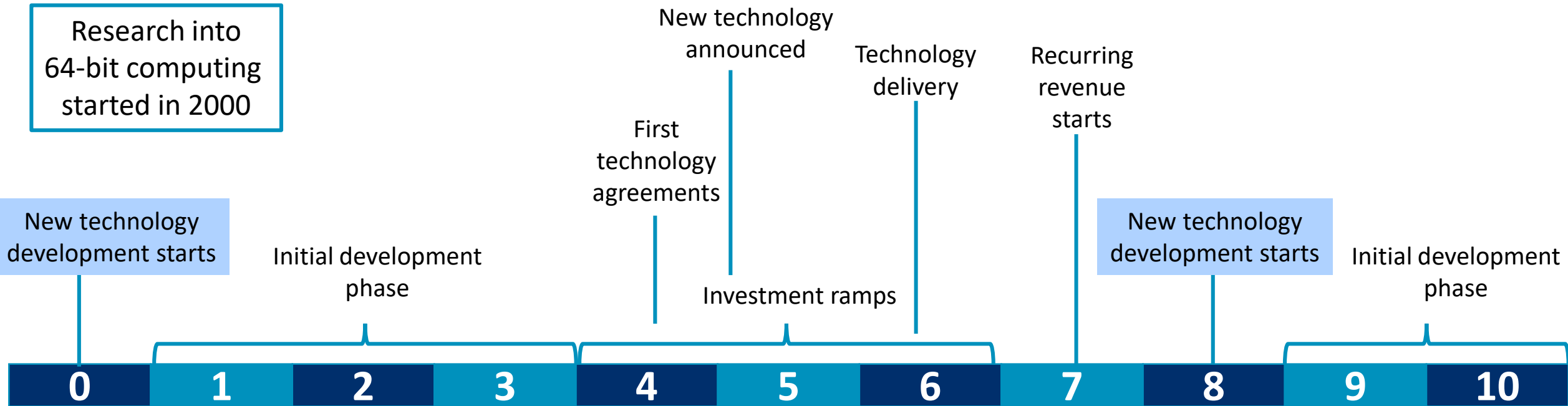
Return on Investments – Arm v8-A case study

Arm incurs R&D costs many years before revenue starts



Return on Investments – General case

Arm incurs R&D costs many years before revenue starts

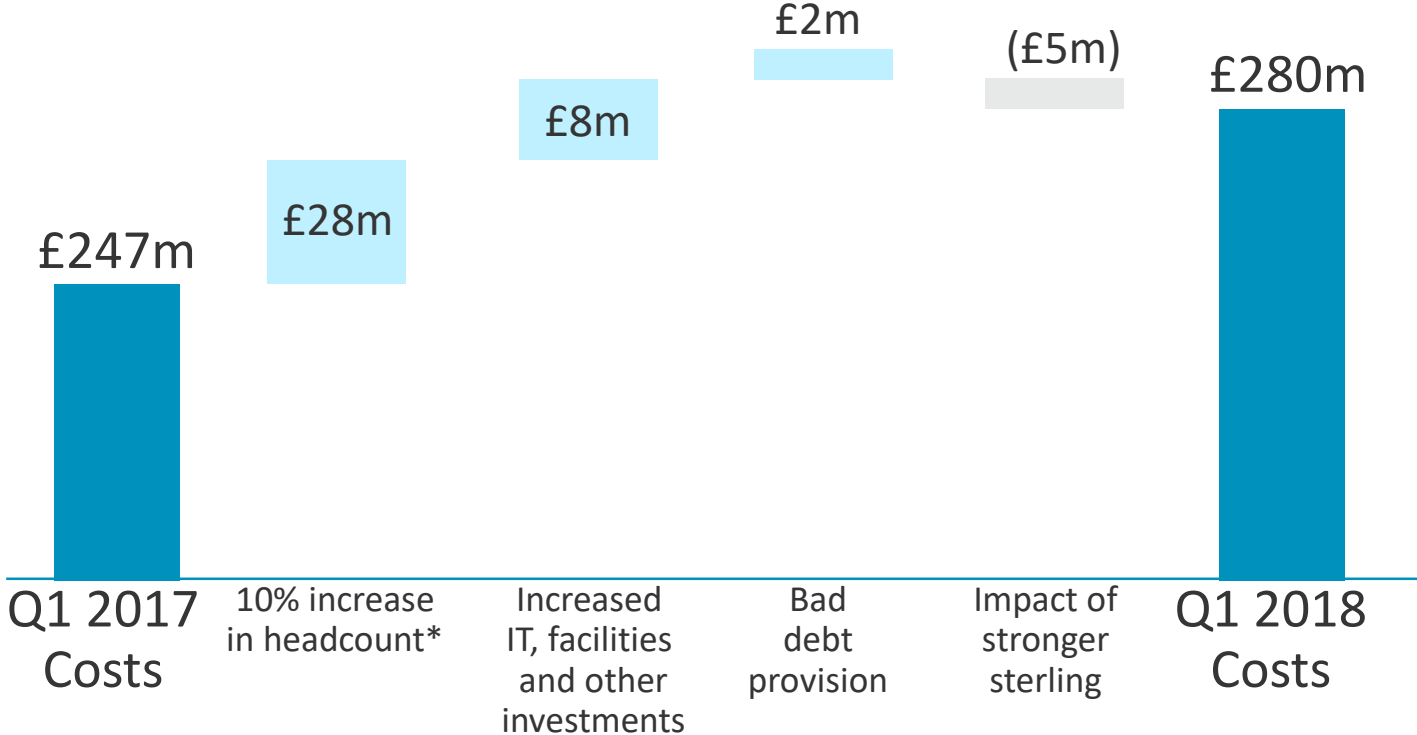


Revenue continues for many years after the investment phase, yielding high profits over time

Investing in people, infrastructure to create new products

Costs are higher in 2018 as Arm expands R&D capability

Cost increases are expected to be consistent with increases in headcount



*17% including the 341 employees transferred to Arm China at the end of Q1

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