Accelerating Innovation: Low-Cost Access to Arm IP

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The Architects of Global Possibilities

The global leader in the development of licensable technology
- R&D outsourcing for semiconductor companies

Focused on freedom and flexibility to innovate
- Technology reused across multiple applications

With a partnership based culture & business model
- Licensees take advantage of learnings from a uniquely collaborative ecosystem

1,690+
licenses, growing by >100 every year

150+bn
Arm-based chips shipped to-date

6.5bn
Arm-based chips shipped in Q3 FY2019

70%
of the world’s population uses Arm technology

530+
Licensees
Industry leaders and high-growth start-ups; chip companies and OEMs
Three Biggest Hurdles with Custom Silicon Designs

- What prevents SoCs from commercial success?

**Time to market**

- Time is money and a competitive advantage
- Early product release means higher margins & more sales

**Return on investment**

- Custom silicon is often low in production volumes, so it’s key to keep upfront costs as low as possible

**Development risk**

- Custom silicon design is a complex process, which can add development risk when not managed properly
Working with Arm Alleviates these Hurdles

- Proven, verified and diverse IP portfolio

**Time to market**

Accelerate development with fast and easy access to a comprehensive IP package of CPU IP, system IP and reference designs

**Return on investment**

Options to license IP at low or no upfront cost to minimize initial investment and reduce overall costs

**Development risk**

Proven and pre-integrated reference designs with out-of-box software support, substantially reducing development risk
Introducing Arm Flexible Access
- A new way to access Arm IP, tools and support

**What?**
- **Arm Flexible Access**
  - Freedom to innovate, evaluate and fully design with Arm IP before committing to production or licensing
  - Access to a range of mature and proven IP including Cortex-A, Cortex-R, Cortex-M cores, security IP, system IP, physical IP and tools
  - Design before you buy, pay only for what is used

**Why?**
- **Greater agility & innovation**
  - More agility to respond to market needs
  - More freedom to select IP to meet your needs
  - Faster time to market
  - Greater opportunities to create new SoCs and build new solutions

**How?**
- **Simpler & improved lifecycle**
  - Pause, change, stop projects, without license payment
  - Simple, straightforward business terms
  - Annual fee covering design rights, tools and standard support
  - Download any or all of the IP package, at any time

Launched July 2019
Arm Flexible Access
– a new customer engagement model

Standard Arm licensing

Arm Flexible Access

Experiment, Start, pause, parallel path
Arm Flexible Access
- Everything you need for an SoC

- **Tools & Models**
  Faster design & development

- **IP**
  Core functionality for any SoC

- **Support & Training**
  Design with confidence
Use Case: Complex Application System

Complex, secure heterogenous compute system

- Multi core coherent application & GPU processing
- Leverage comprehensive Arm software ecosystem, including Arm NN for AI, Linux and Trusted Firmware
- Multiple microcontrollers for dedicated deeply embedded control
- Advanced security features

Components:
- Quad core Cortex-A53
- Quad core Cortex-A53
- Interrupt Control
- Mali-G52 GPU
- Network Interconnect
- Coherent Interconnect
- TrustZone controller
- MMU
- Customer-sourced IP
- Peripherals
- CryptoCell-712
- Cortex-M4 x4
- Debug & Trace

Applications:
- Drone
- Industrial control
- IP Camera
What is Included?
- Mature and proven IP

**Mainstream package**

### Processors
- Cortex-A53
- Cortex-A35
- Cortex-A34
- Cortex-A32
- Cortex-A7
- Cortex-A5 (UP and MP)
- Cortex-R52
- Cortex-R8
- Cortex-R5
- Cortex-M33
- Cortex-M23
- Cortex-M7
- Cortex-M4
- Cortex-M3
- Cortex-M0+
- Cortex-M0

### Graphics Processors
- Mali-G52
- Mali-G31

Also includes Mali DDKs

### CoreLink Interconnect
- CoreLink NIC-450
- CoreLink NIC-400
- CoreLink CCI-400
- CoreLink CCI-500
- CoreLink CCI-550
- ADB-400 AMBA domain bridge
- XHB-400 AXI-AHB bridge

### System Controllers
- CoreLink GIC-500
- CoreLink GIC-400
- PL192 VIC
- CoreLink TZC-400
- CoreLink L2C-310
- CoreLink MMU-500
- BP140 Mem. Intf
- BP141 TrustZone Mem. Wrapper

### Security IP
- CryptoCell-312
- CryptoCell-712
- True Random Number Generator

### Peripheral Controllers
- PL011 UART
- PL022 SPI
- PL031 RTC
- CoreLink DMA-230
- CoreLink DMA-330

### CoreSight Debug & Trace
- CoreSight SoC-400
- CoreSight SDC-600
- CoreSight STM-500
- CoreSight System Trace Macrocell
- CoreSight Trace Memory Controller

### Physical IP*
- Artisan physical IP platform, TSMC
- Artisan PIK for Cortex-M33, TSMC 22ULL

### Corstone Foundation IP
- Corstone-101
- Corstone-201

### Tools & Models
- Socrates IP Tooling
- Arm DS-Gold
- Virtual system models (fast & cycle accurate)

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75% of Arm Cortex licenses over past 2 years

Legend: IP Products | Tools & Models
## Annual Access Fee - Mainstream Package Tiers

<table>
<thead>
<tr>
<th>Service</th>
<th>Academia / Research</th>
<th>Entry</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access to IP</td>
<td>✓ (Except Crypto)</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Technical support</td>
<td>Community based</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Onboarding session</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Evaluation, exploration and design</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Number of tape-outs per year</td>
<td>Unlimited</td>
<td>1</td>
<td>Unlimited</td>
</tr>
<tr>
<td>Online training seats</td>
<td>5</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td>Arm Development Studio (Arm DS Gold)</td>
<td>1 seat</td>
<td>1 seat</td>
<td>3 seats</td>
</tr>
<tr>
<td>Arm configuration tool - Socrates</td>
<td>1 seat</td>
<td>1 seat</td>
<td>1 seat</td>
</tr>
<tr>
<td>Arm virtual system models</td>
<td>1 seat</td>
<td>1 seat</td>
<td>2 seats</td>
</tr>
<tr>
<td>Arm Service Tokens (training/support/...)</td>
<td>No</td>
<td>Purchased separately</td>
<td>15 Service Tokens</td>
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<tr>
<td>Annual Access Fee</td>
<td>$0k per annum</td>
<td>$75k per annum</td>
<td>$200k per annum</td>
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</tbody>
</table>
## Transparent and Predictable Pricing

- Consistent and fixed pricing for all members

### Annual access fee

Includes:
- Access to IP, tools & models
- Design and dev rights (including FPGA proto)
- Support and maintenance for registered projects

### Product licence fees

- Per-product manufacture licence fee at tape-out
- Transparent pricing
  - Simple
  - Full price list upfront
- Discount for multiple Arm IP
- Only pay for what you need

### Royalties

- Per-product royalty rate
- Known upfront
- Rate applies perpetually for product configuration
- Simple flat %ASP rate
- Discount for multiple Arm IP
- Royalty calculator available
Successes and Reach

Initial engagement target exceeded > 40 Customers signed up

- 1/3 = Silicon Start ups
- 1/3 = ASIC design houses
- 1/3 = Established Silicon

Arms success is aligned with our customers’ success
Where Next for Arm Flexible Access

- A live program evolving with its customer needs

More IP added every quarter – e.g.

- Functional safety packs
- Arm Cortex-M CPUs with Arm Custom Instructions
- More physical IP

Wider industry reach:

- Interest from governmental institutions
- Collaboration with Incubators
- Other organisations who are promoting semiconductor innovation

Wave of program enhancements and extensions through next 18 months
Arm Flexible Access
- Unleashing innovation

Easy design exploration
Simple contract
Broad IP portfolio

Faster innovation
flexibleaccess.arm.com
More Ways to Access Arm Technology

**Arm DesignStart**
- Fast, lowest-cost access to a select mix of IP

**Arm Flexible Access**
- Explore a wide range of IP before licensing

**Standard Licensing**
- Range of licensing terms across the full Arm portfolio

New!
Get Started with Arm IP – Talk to Us and Explore More Online

Arm DesignStart
DesignStart.arm.com

Arm Flexible Access
https://www.arm.com/products/flexible-access/

Flexible Access for Academia
Thank You!
Merci!
Danke!
谢谢!
ありがとう!
Gracias!
Kiitos!
감사합니다
धन्यवाद

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