

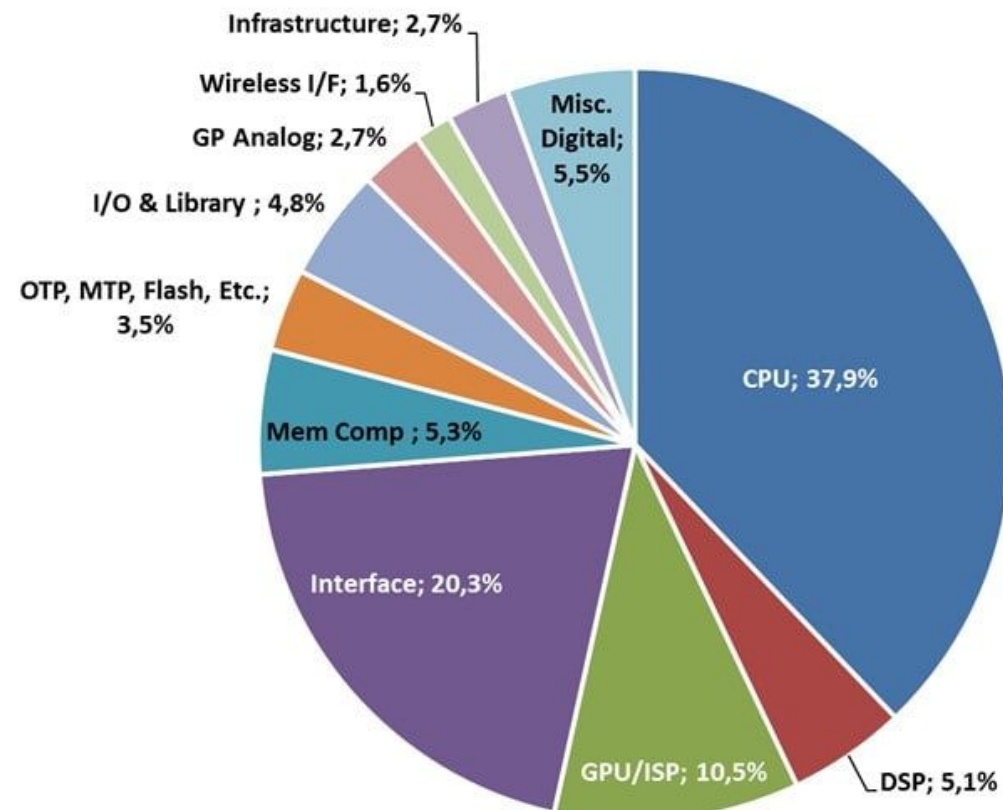
IP Status 2010-2019

IP Forecast 2020-2030

Eric Esteve IPnest Founder
(Semwiki blogger)

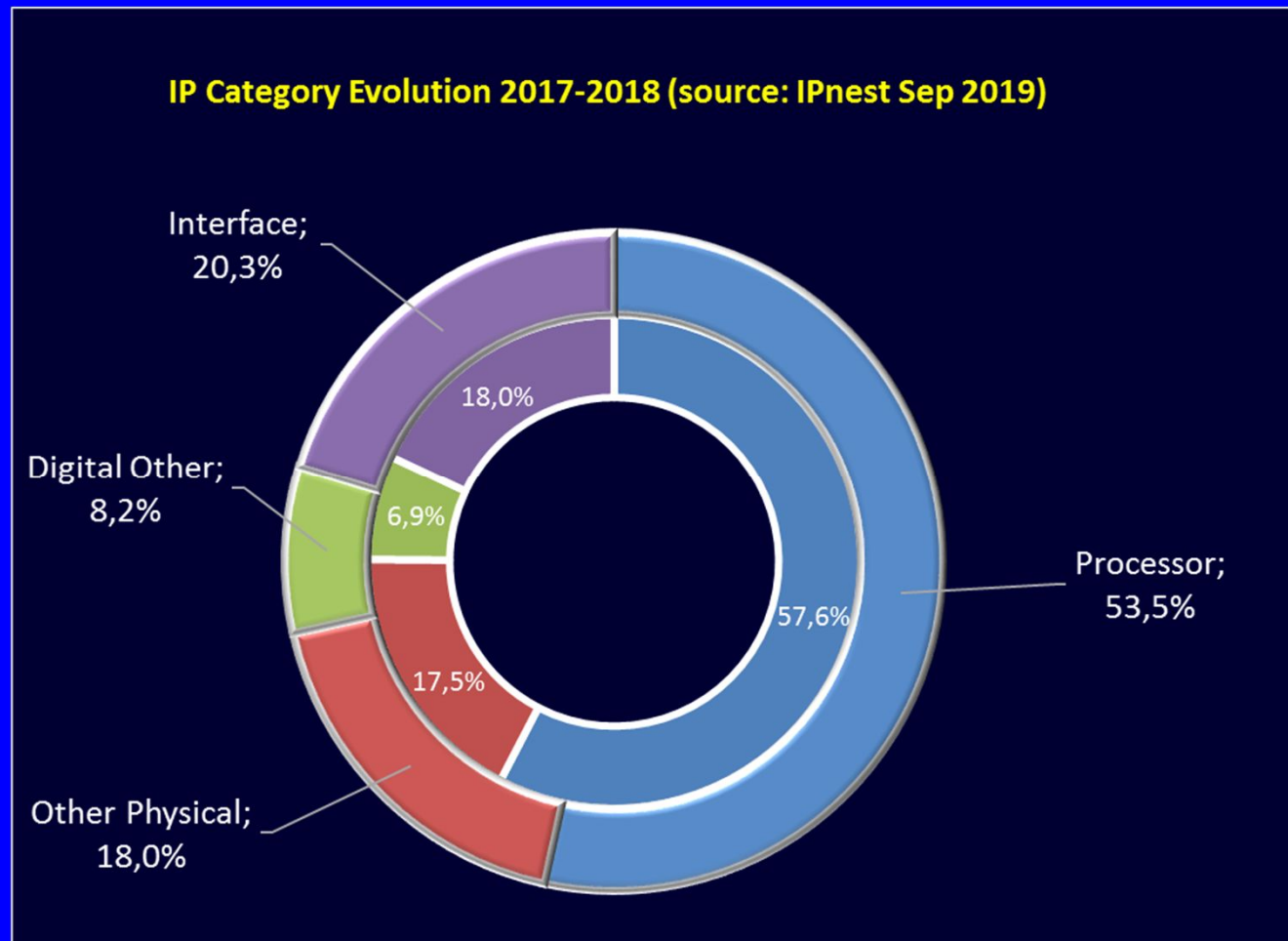
IPnest IP Market Status (Design IP Report 2019)

DESIGN IP By Category 2018 (source: IPnest - Sept 2019)



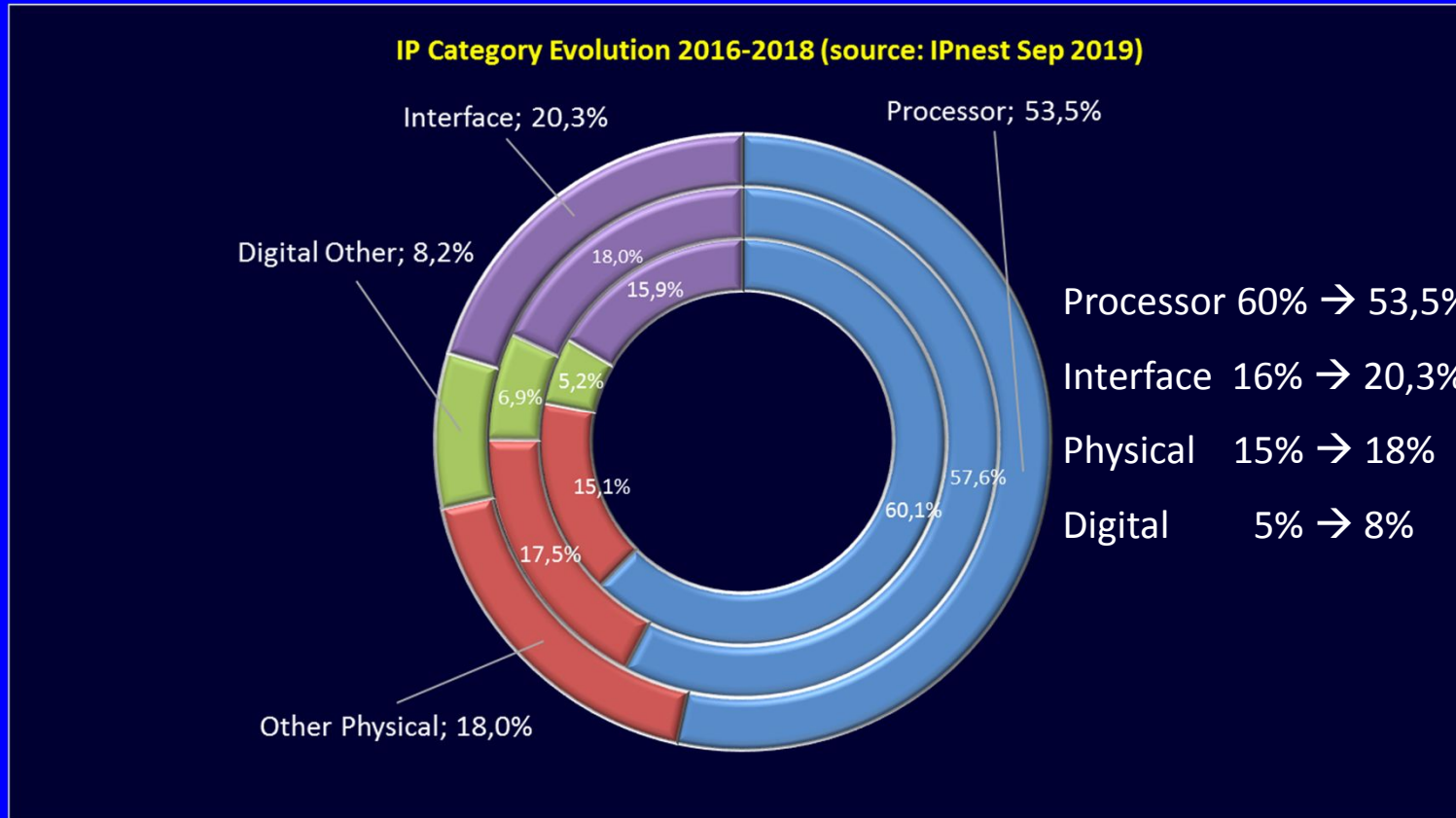
2017-2018 Evolution

Processor, Wired Interface, Oth. Physical IP, Oth. Digital IP



2016-2018 Evolution

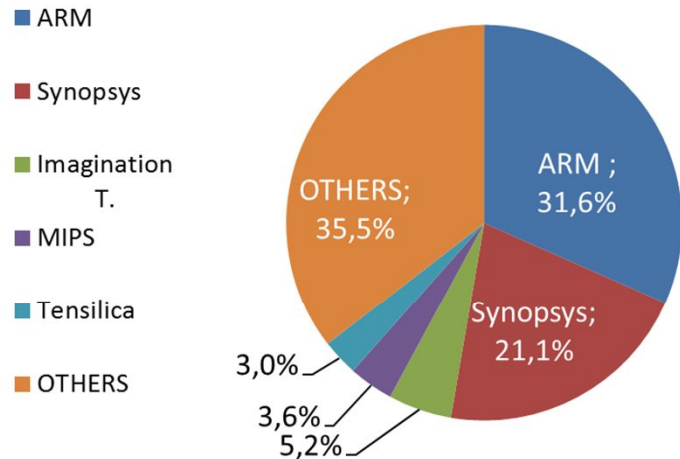
3 years evolution confirm the trend!



License 2012-2018

Top 5 Design IP vendor LICENSE market share ranking 2012

(Source: Gartner 2013)



Design IP - 2012 (Gartner) 2 140,6

License revenue 1 072,9

Royalty revenue 933,4

Service and maintenance 134,3

4 out of 5 Processor IP vendors in 2012

Design IP - 2018 (Ipnest) 3 635,8

License Revenue 1 885,8

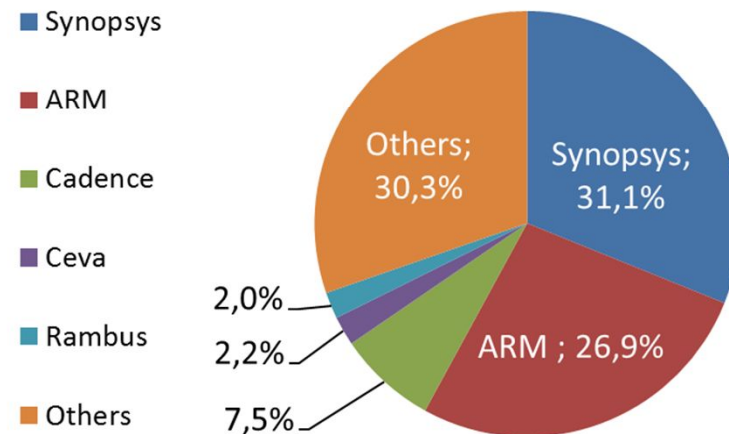
Royalty Revenue 1 750,0

2 out of 5 Pure Processor IP vendors in 2018

2 being "one-stop-shop" IP vendors

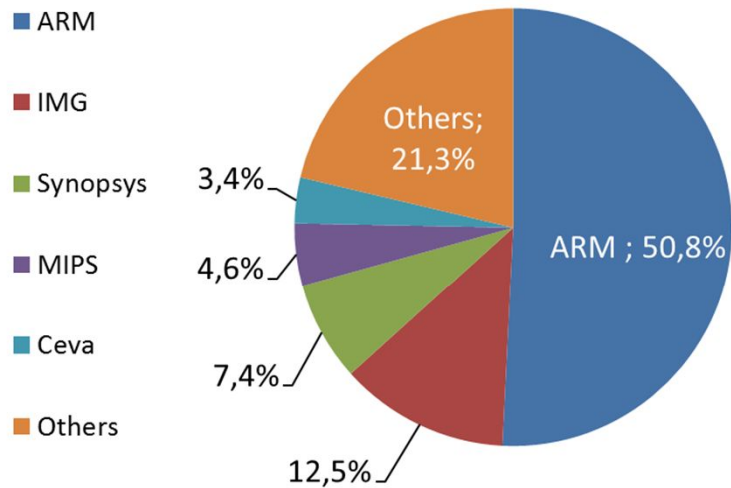
Top 5 Design IP vendor LICENSE market share ranking 2018

(Source: IPnest 2019)



Royalty 2012-2018

Top 5 Design IP vendor ROYALTY market share ranking 2012
(Source: Gartner 2013)



2018 Royalty based model is no more the only way to success...

Synopsys & Cadence revenue growth is linked with high count of license sales in many segments

IMG vs Apple story illustrate the risk to focus on 1 segment/customer only...

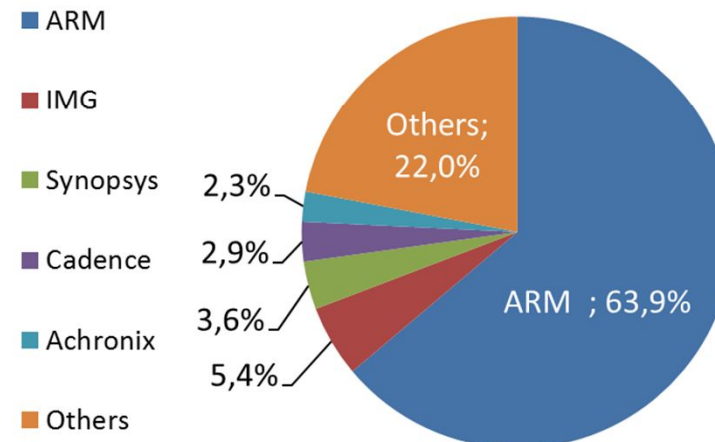
2020 decade

Strong focus on a single product: eNVM, NoC, RISC-V or PCIe (eMemory, Arteris, SiFive, PLDA)

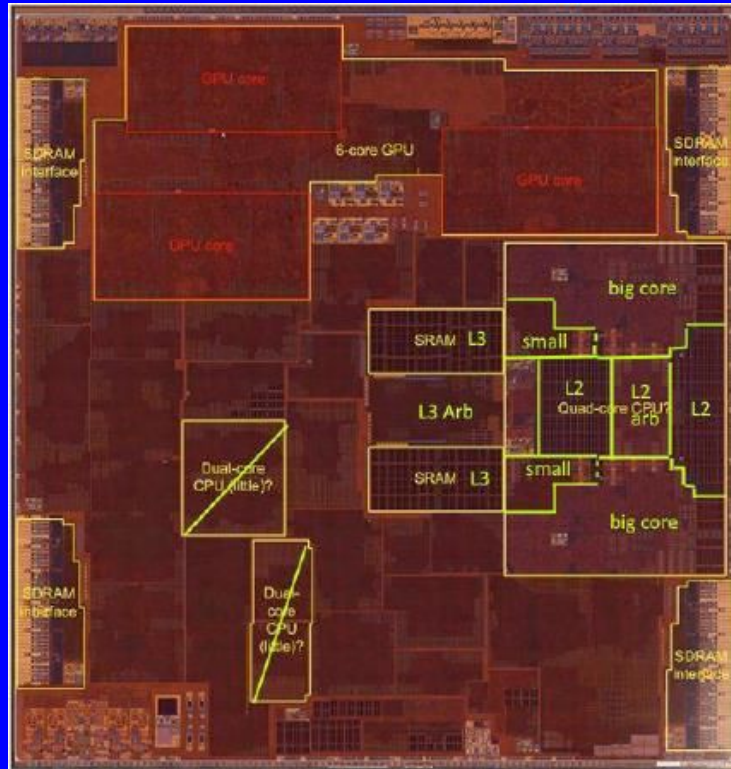
Diversified (One-stop-shop) IP offer, being able to be leader (#1 or #2) for each product (Synopsys, Cadence)

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Top 5 Design IP vendor ROYALTY market share ranking 2018
(Source: IPnest 2019)



IP Drivers in 2010's



Smartphone Application Processor (A10 from Apple)

- CPU (2 large, 2 little), multiple GPU
- SRAM compiler, Std Cell Library, I/Os
- LPDDRn memory controller
- USB 2, USB 3,
- HDMI, MIPI CSI, DSI, UFS
- Total IP > 100

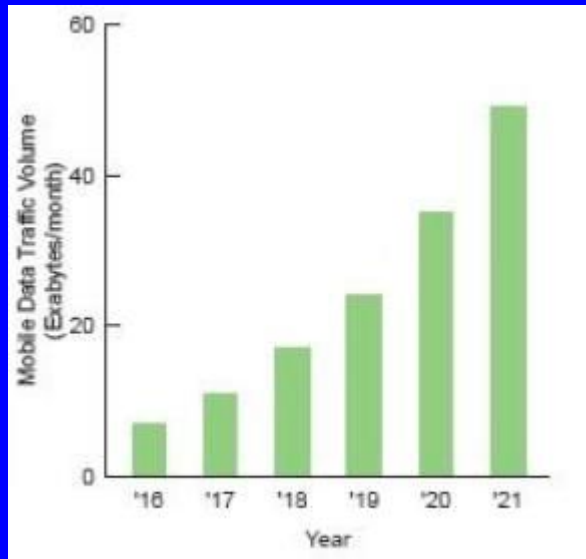
Set Top Box (STM devices) → Consumer

- Very similar except MIPI

Networking

- Ethernet, PCIe, SAS, DDR controller
- TCAM compiler

IP Drivers in 2020's



Smartphone Application Processor

- Still important revenue source (royalty)
- No more driver, stable at best
- Handful supplier count... and license count

Data Center (HPC, Networking, AI, servers)

- Ethernet, PCIe, SAS, C2C, DDR or HBM controller,+
- Data traffic growth (+40% YoY)
 - Implement more systems
 - Speed up new release adoption
 - 112G SerDes, PCIe 5, DDR5, HBM2e,
- Impact on IP revenue?
 - New IP: C2C, HBM, GDDR
 - ASP increase (\$6M for 112G)
 - License count increase (AI start-up)

Automotive and Industrial (IoT) expected to grow

- Processor CPU, GPU and DSP – What after the peak?
 - CPU: business model to be re-invented (market requirement)
 - Traction on RISC-V (102 licenses /18 month SiFive) when ARM revenues decline
 - Outsiders in better shape (Synopsys, Andes, Cadence...)
 - GPU (Display): catastrophic! Apple (internal) and Samsung (via AMD)
 - GPU (AI): promising, IP product TBD
 - DSP: need to diversify, find other segments than wireless phone
- Traditional Interfaces: USB, SAS, SATA, HDMI... slightly growing or flat except MIPI
- High Perf Interfaces: Ethernet, PCIe, C2C, Memory Controller – Explosion!
 - PAM4 112G and NRZ SerDes support Data Center, Networking, 5G and AI growth
 - DDR5, LPDDR5, HBM2, LPDDR6 license ASP explosion (7nm, 5nm)
- Wireless Interface (WiFi, BTLE) IP sales growth (CEVA, IMG)

- Foundation IP
 - Library slightly growing
 - SRAM memory compiler – flat
 - NVM memory compiler – growing
- Analog Mixed Signal: only HE rewarding (Silicon Creations)
- Misc Digital
 - NoC is no more a concept! Duopole ARM & Arteris
 - eFPGA IP: adoption expected... when? Achronix lead the pack!
 - Image Processing IP to grow

**Conclusion: Innovation, Highest Quality (SerDes)
And New Business Model (Processor) required**

IPnest's Customers List

Synopsys	(US)	ARM SB	(UK)
Cadence	(US)	LETI	(France)
Mentor Graphics	(US)	IMEC	(Belgium)
GlobalFoundries	(US)	STMicroelectronics	(France)
Arasan	(US)	Nokia Networks	(Finland)
SiFive	(US)	Menta	(France)
Silvaco	(US)	PLDA	(France)
Cast	(US)	HDL DH	(Serbia)
Facebook/Oculus	(US)	Algodone	(France)
Texas Instruments	(US)	Dolphin Design	(France)
Rambus	(US)	TSMC	(Taiwan)
INTEL	(US)	UMC	(Taiwan)
True Circuits	(US)	SMIC	(China)
NorthWest Logic	(US)	Verisilicon	(China)
Silicon Creations	(US)	GUC	(Taiwan)
Xilinx	(US)	KSIA	(Korea)
Open Silicon	(US)	SONY	(Japan)
University of Michigan	(US)	GDA	(India)
Alphawave	(Canada)	Anurag	(India)
Achronix	(US)	Silabtech	(India)
Bain & Co.	(US)	Krivi	(India)

IPnest is considered as the WW expert in Design IP

- **Martin Lund**: *"In past I used IPnest reports covering the Interface IP markets. I found these reports helpful and insightful" (was VP of IP Group with Cadence)*
- **Ed Bard**, Vice President of Business Operations, **Synopsys**: *"Dr. Eric Esteve provides an insightful analysis of the USB 3.0 market. This report is useful to anyone..."*
- From **Lluis Paris**, Director WW IP Alliance, **TSMC** *"... IP Guru..."*

Since 2009, IPnest deliver two main reports, plus on-demand survey

- **"Interface IP Survey & Forecast"** (USB3, PCIe, DDRn, HDMI, SATA, Ethernet, SerDes) in Q2 2020
- **"Design IP Report"**, IP market share by category (CPU, GPU, DSP, Interface, AMS, etc.) in Q1 2020
- **"PHY & SerDes Survey & Forecast 2019-2024"** released in Q4 2019