Innovation in Design Service

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Brite semiconductor

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CONTENTS

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Revolution in Business Model

Paradigm Shift of the Semiconductor Industry

Before 1989 (Pre-PC ERA)

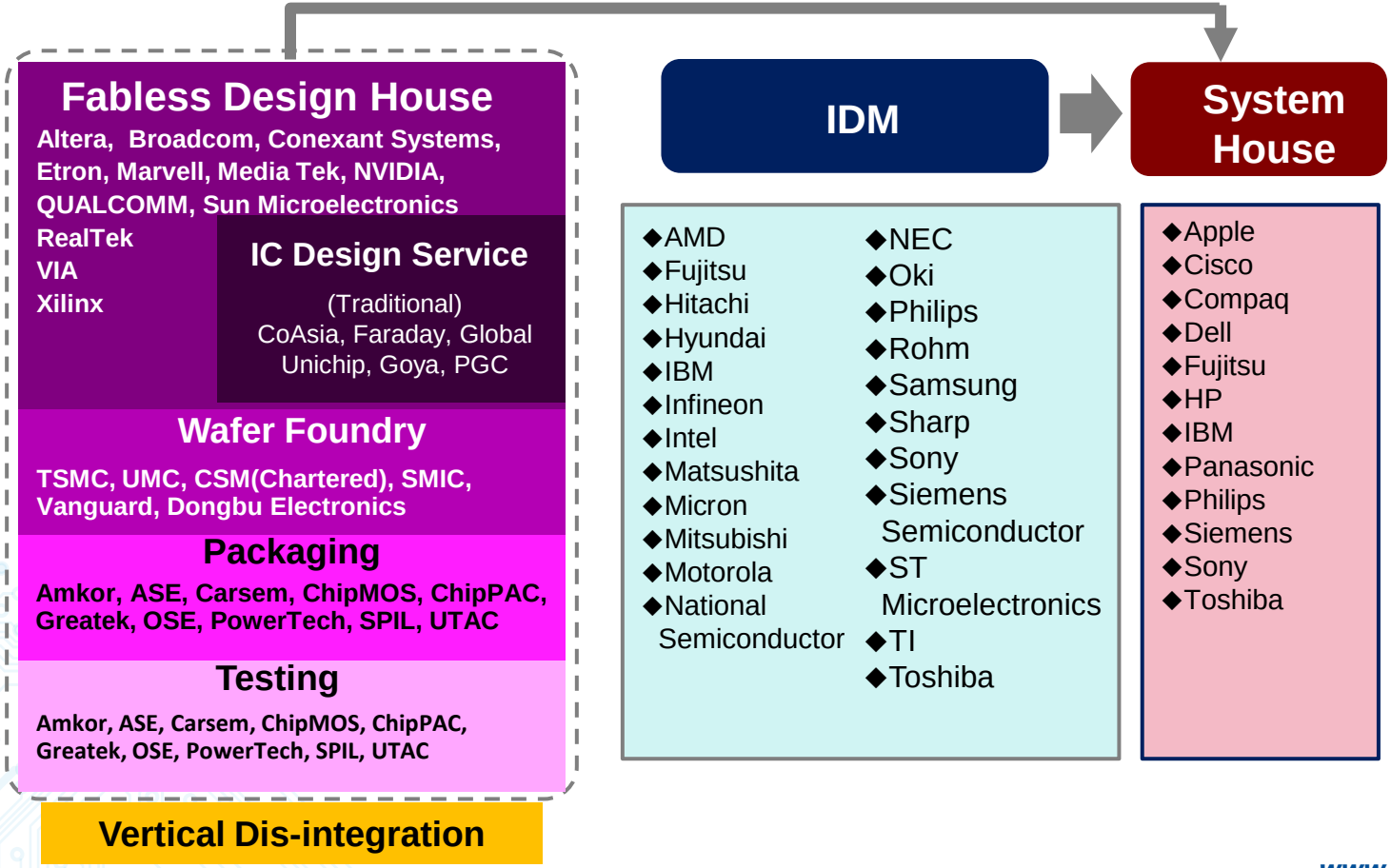
IDM (Integrated Device Manufacture) → **System House**

IC Definition Design Spec IC Design IC Fabrication Package Testing Sales & Support	◆Fairchild Semiconductor ◆Fujitsu ◆Hitachi ◆IBM ◆Intel ◆Mitsubishi ◆Motorola ◆National Semiconductor ◆Oki ◆Panasonic ◆Philips ◆RCA ◆Siemens Semiconductor ◆SJ Thompson ◆TI ◆Toshiba ◆Zilog

◆Apple
◆Burroughs
◆Cisco
◆Compaq
◆Control Data Corp.
◆Data General
◆Dell
◆Digital Equipment
◆Fujitsu
◆General Micro Electronics
◆Honeywell
◆HP
◆IBM
◆NCR
◆Panasonic
◆Philips
◆Prime
◆Siemens
◆Sony
◆Sperry
◆Toshiba
◆Univac
◆Wang Labs

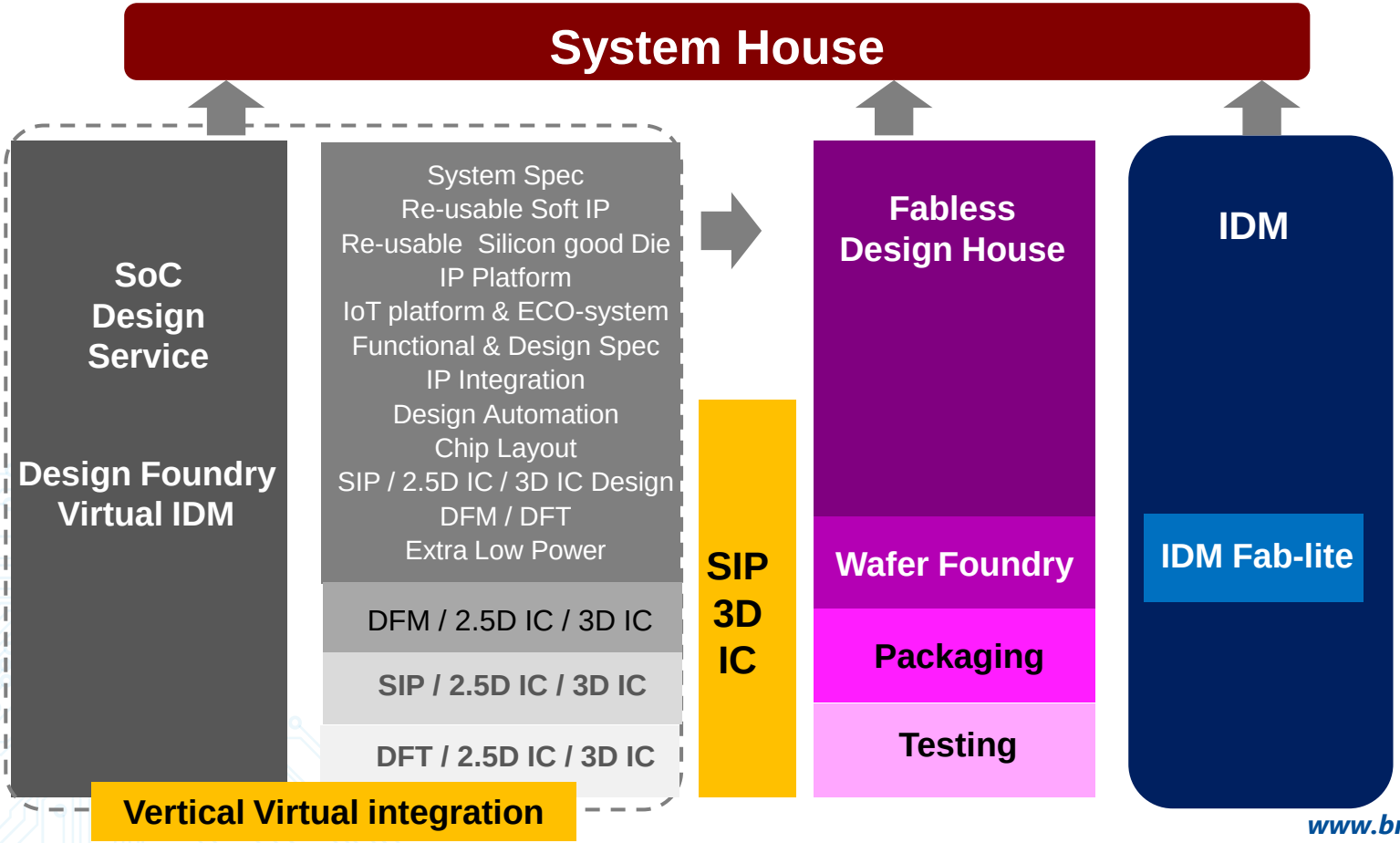
Paradigm Shift of the Semiconductor Industry

1990-2000 PC ERA



Paradigm Shift of the Semiconductor Industry

2013~ New SoC / IoT ERA



First Fab-Lite, Then Design-Lite

- More and more SoC will rely on KGD/3DIC to achieve the needed upgrade than pure process advancement.
- Silicon IPs will exist both as soft-core and KGD.
- Most Fabless and System Co. can not afford the heavy investment for in house 3DIC capability , but turn to SoC Design Service Co. who possess the 3DIC capability for design support.
- Design Lite Era (for Fabless and System House) is now begin to become reality.

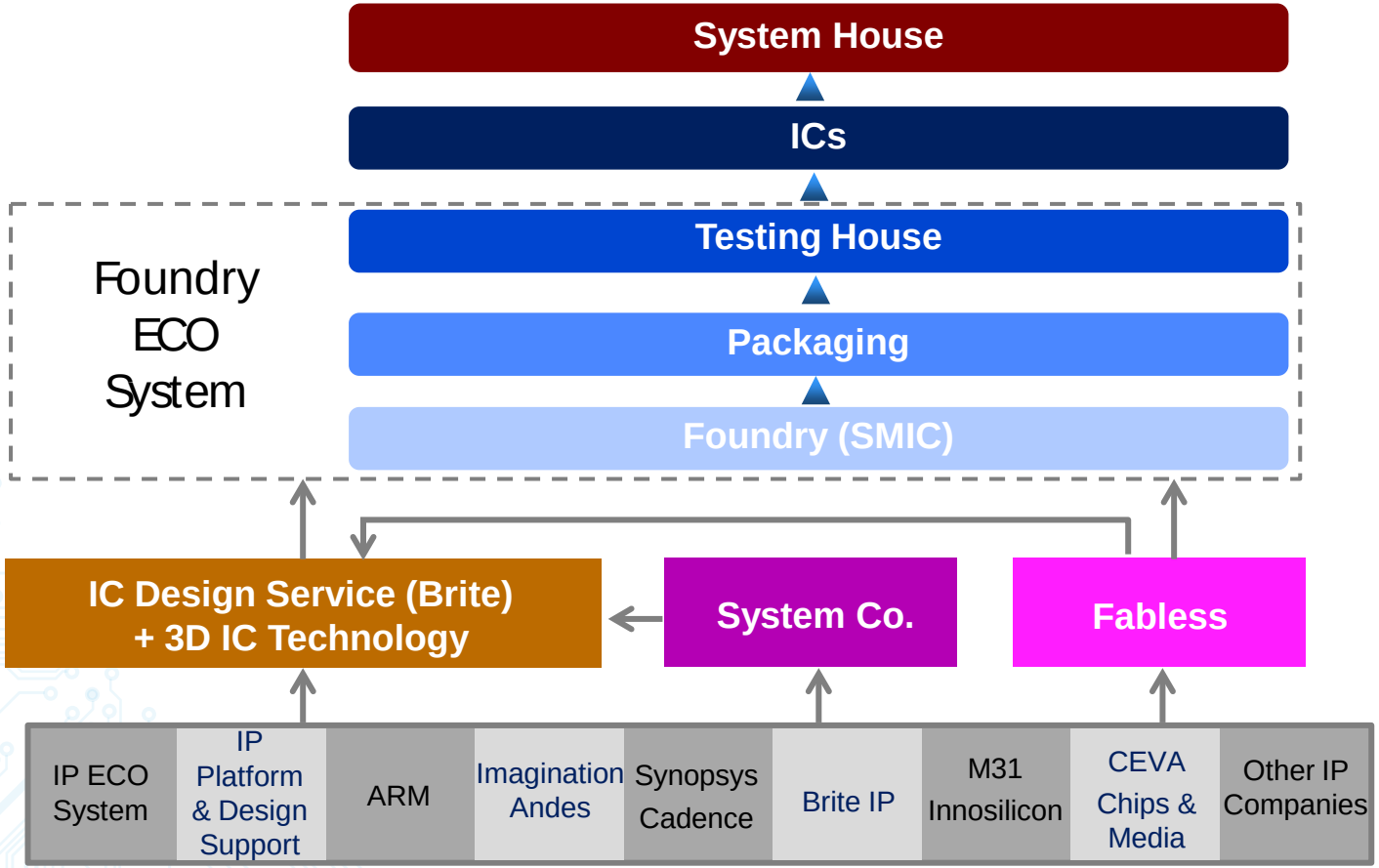
Fab- Lite

Design- Lite

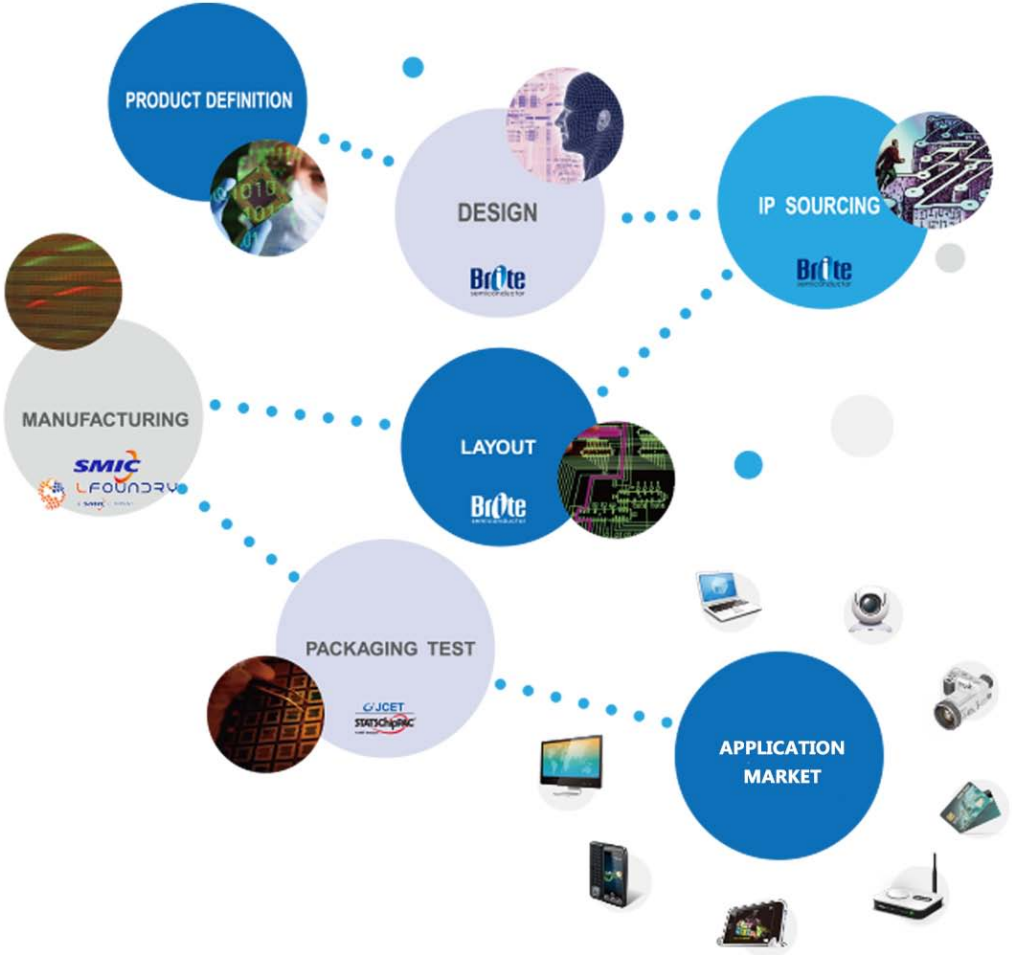
2

Trusted Eco-System

The New Design-Lite world



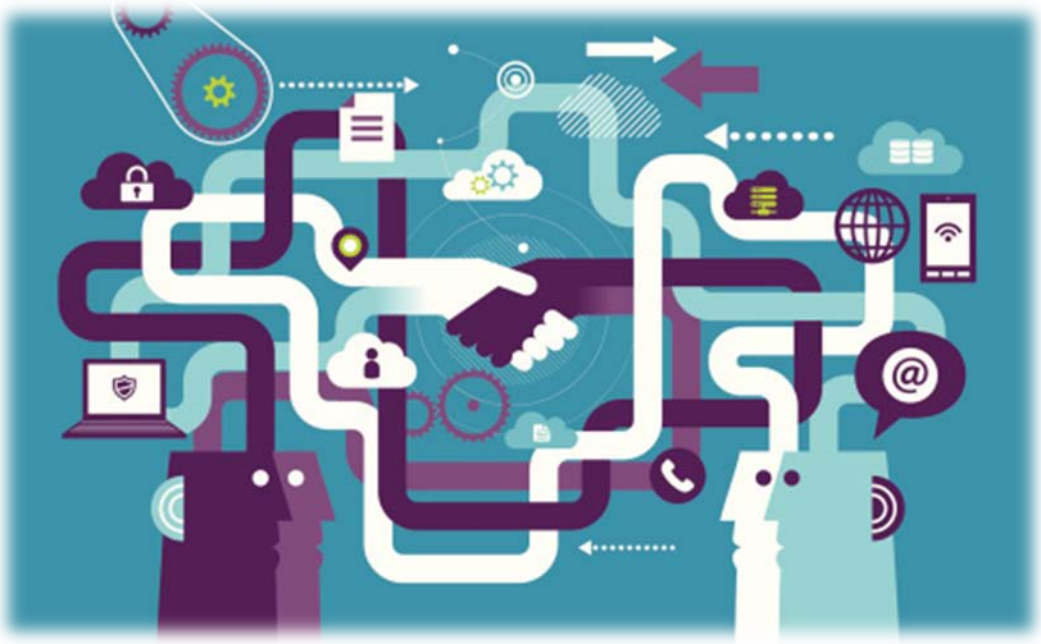
Advanced Design Service Supply Chain



Relationship with SMIC

Strong support from SMIC + LFoundry beyond Brite

- **Price**
- **Capacity**
- **Cycle Time**
- **Yield & Quality Control**
- **Service & Supporting**
- **Assurance**



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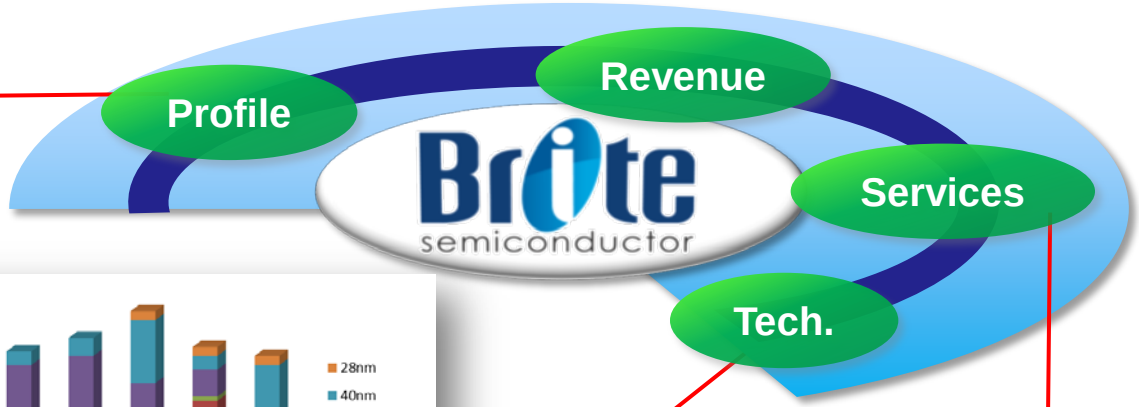
Brite's Offerings:
Design Flows, IPs, Platforms

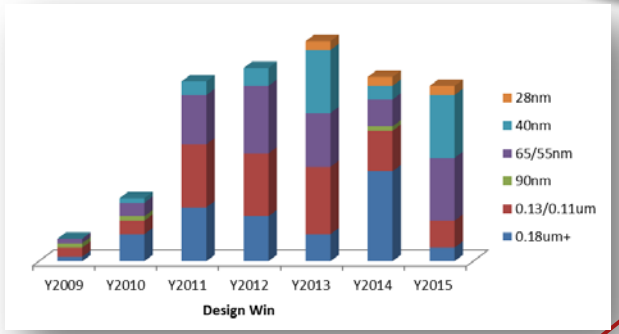
Who is Brite?

Design Service Company
Founded in 2008 with VC from Silicon valley

Major shareholder : SMIC

130+ Employees (80% are R&D)





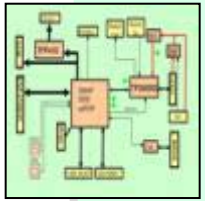
>240 design wins in 6 years

Projects focus on the advance process node (<65nm)

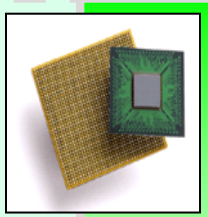
We provide ASIC design services and ARM CPU ,CEVA DSP and SNPS ARC based SoC platform.

Total Solution : OEM+ODM

Product Specification



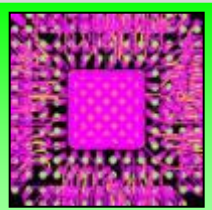
Architecture & RTL Design



IP Selection & Integration

IC Physical Design

Wafer Fabrication

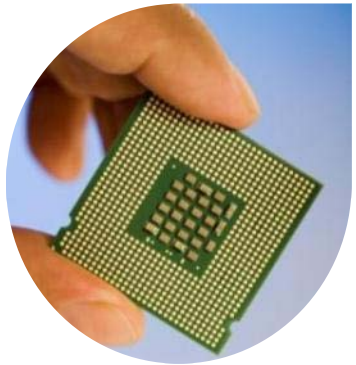


Package and Assembly

Test & Prod Engineering

Prod & Logistics

SDK Development



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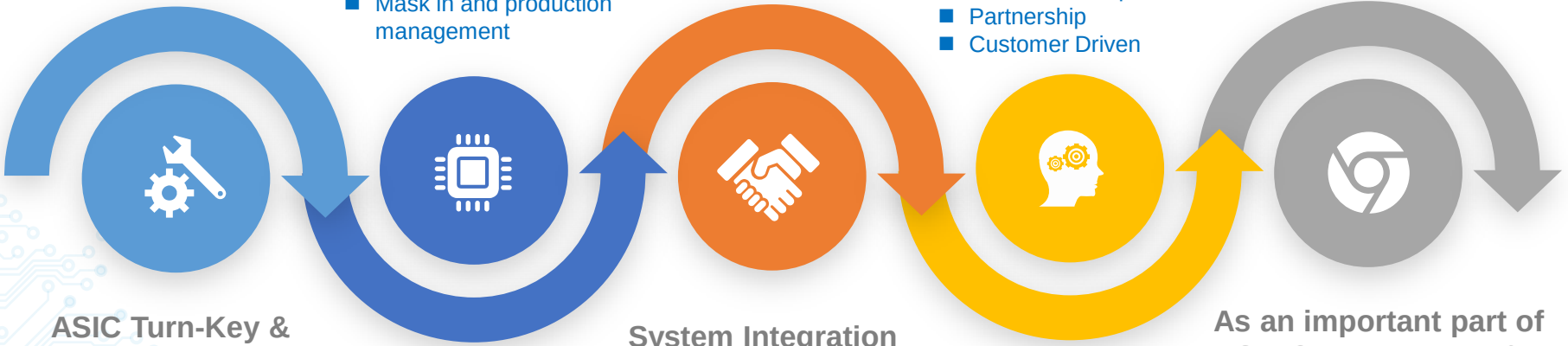
Brite's Service Offerings



ASIC Turn-Key & SoC Services

- Spec/RTL/Netlist to Silicon, complete hardware service
- Porting/Shrinking from an existing product to a derivative product, from other FAB to SMIC

Tape out & Manufacturing Services

- GDS in
- Mask in and production management

System Integration Services

- ARM Core based system integration
- CEVA/Cadence DSP Core based system integration
- Synopsys Core based system integration

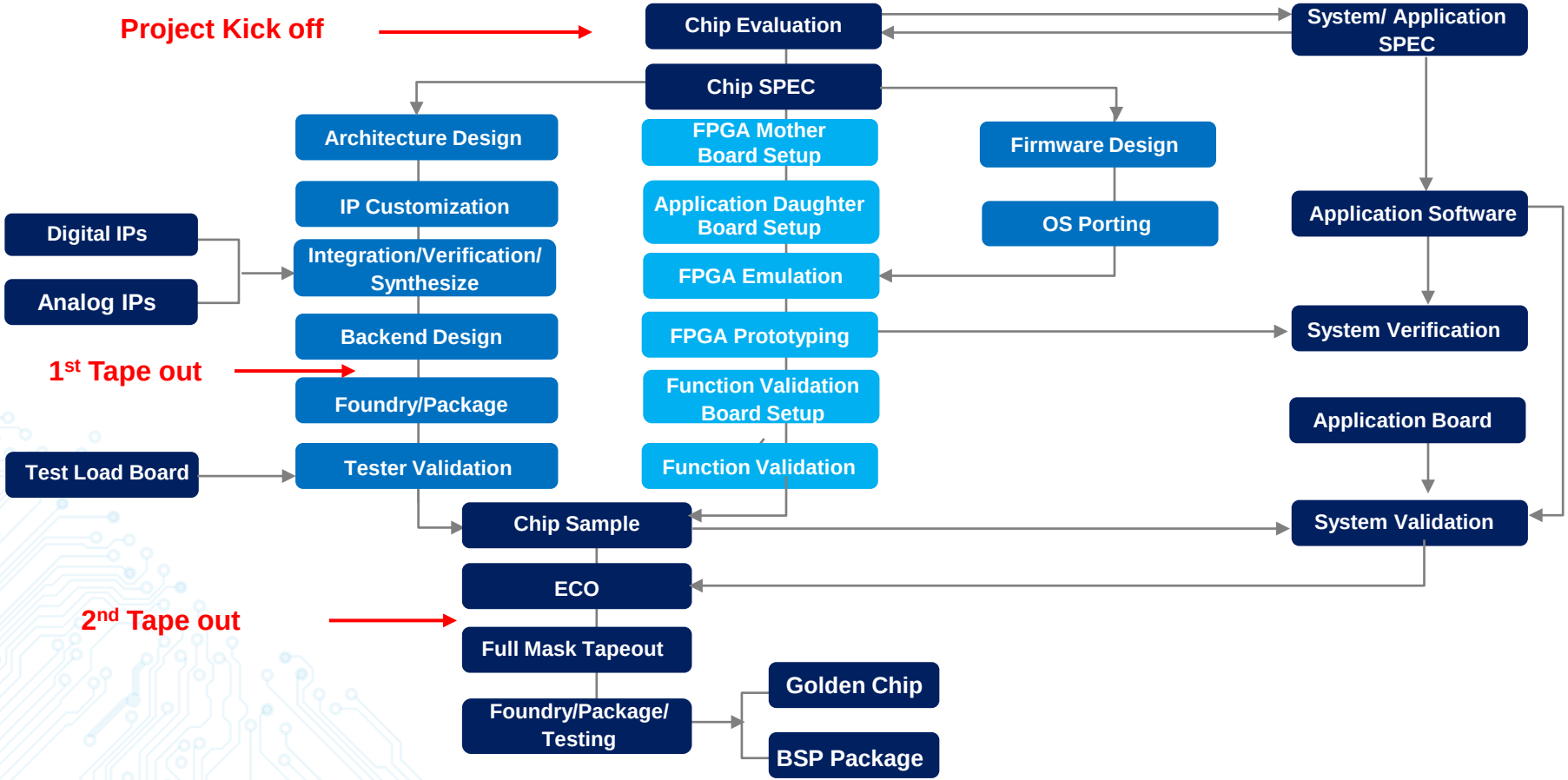
IP Procurement & Customization Services

- Internal development
- Partnership
- Customer Driven

As an important part of SMIC eco-system & a bridge to the China markets

- Platform development
- Design porting
- PDK QA & IP QA

SOC Flow to System House



SOC Backend Design

IC-ONE

An ecosystem for IP management, SOC design flow and big data application platforms

0

IP management

Build, track, reuse IP

0

IP reuse

Library setup file auto generation
IP version control
Supported IP reuse in SOC design

0

Project management

Project registration
Library info registration
Project workflow management

0

Smart plug-In for EDA

Knowledge tree

0

Transparent visualization of project details

Data mining application in SOC design
Data visualization

0

Push button retrieval

Smart push button retrieve for project experience and smart reuse.

0

PPA Evaluation

Base on spec. to evaluate PPA

0

Advanced tech. solutions

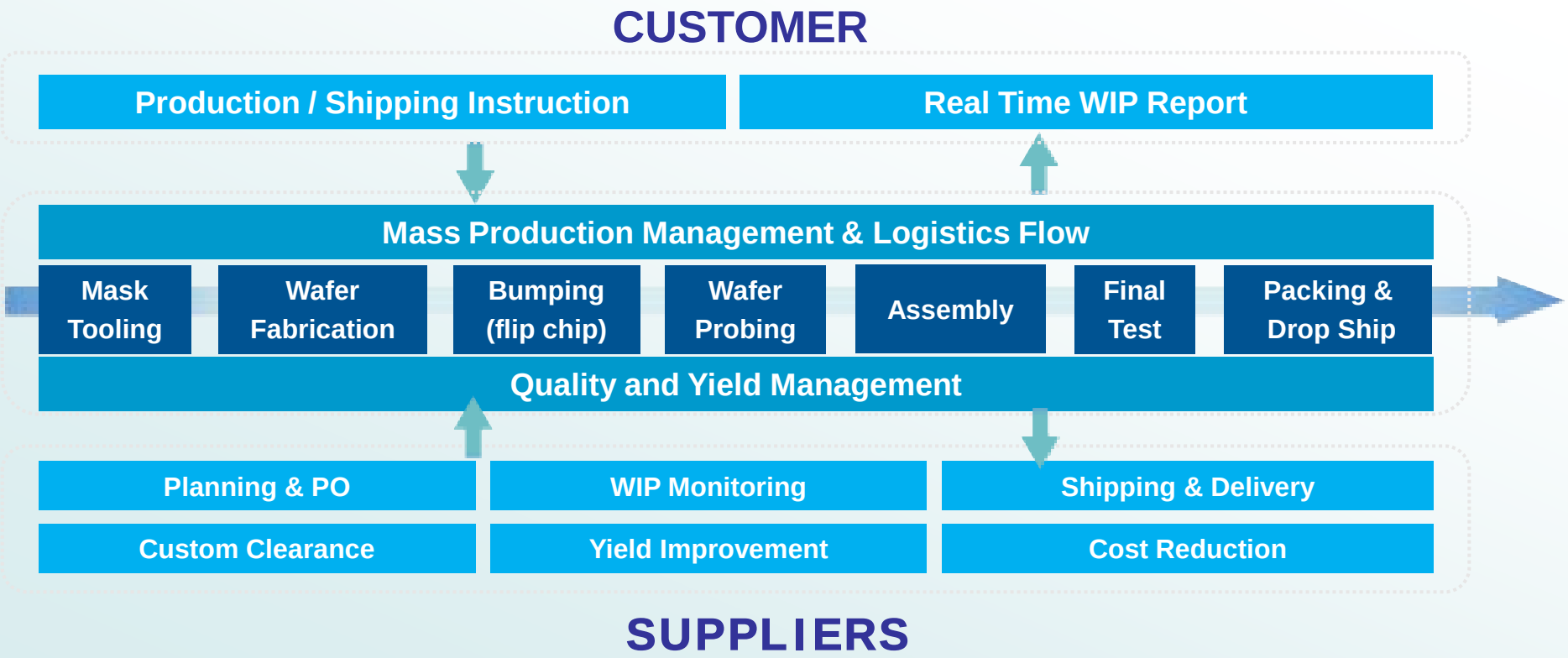
Web application
Support mySQL, sqLite database
Platform architecture effectively supports sustainable development

0

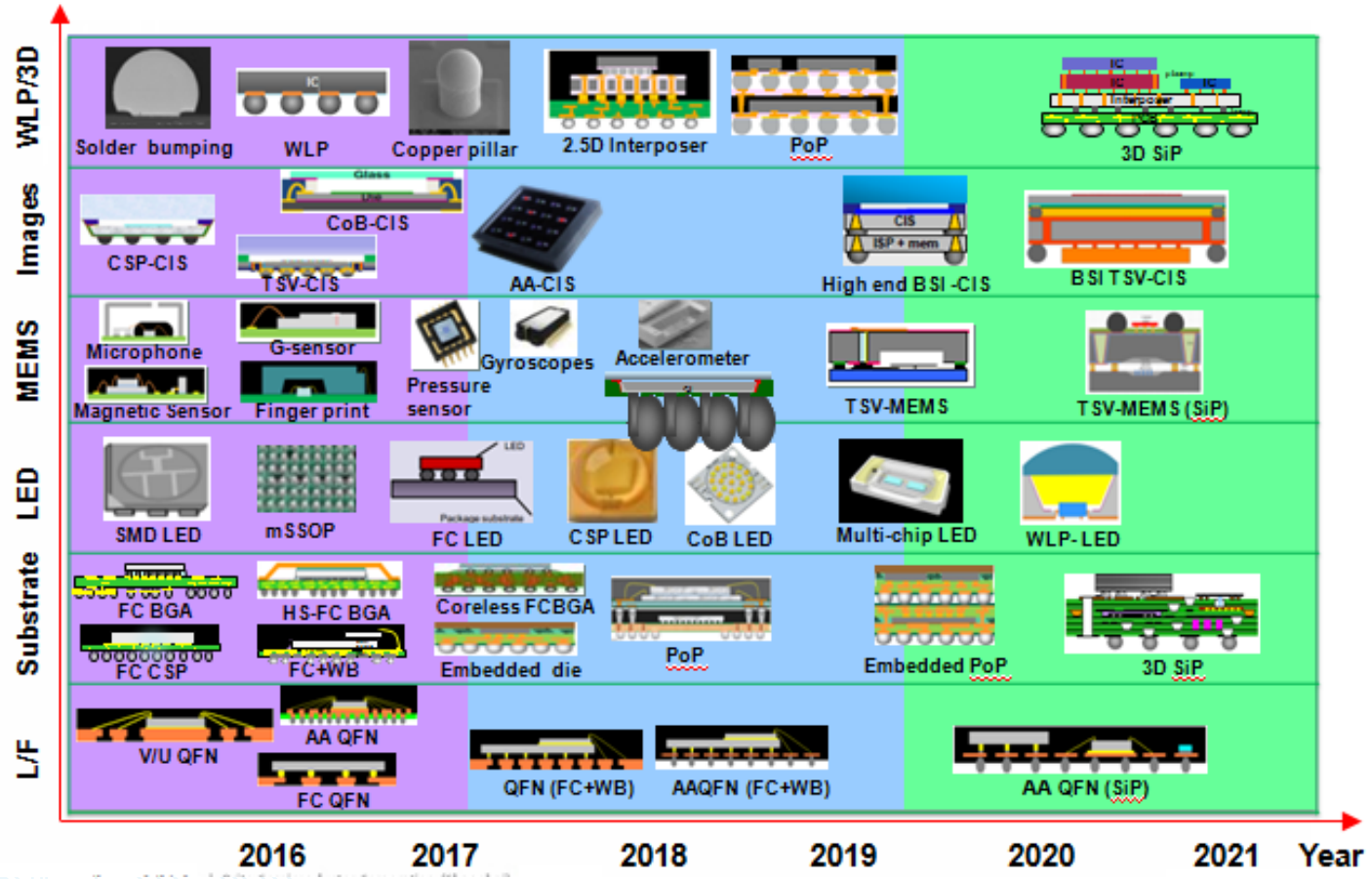
Benign ecosystem

The architecture design takes IP management, IP reuse and SOC design into consideration and forms closed cycle.

One Stop Operation Flow



Brite New SiP Roadmap



Rich IP Availability

Brite semiconductor

Std Cell/ Memory/IO

Cell Library	Memory Complier	Std. IO	SDIO
0.35um-28nm	0.18um-28nm	0.35um-28nm	0.11um-28nm
0.25um-90nm	0.25um-28nm	0.25um-0.11um	0.13um-40nm

Fundamental IP

Regulator	DC/DC	Cap-less LDO	Power On Reset	Crystal OSC	Temp.Sensor
0.18um-28nm	0.18um-55nm,95ULP	0.18um-28nm	0.18um-28nm	0.18um-28nm	95nm ULP,55nm
0.13um-40nm	0.13um-55nm	0.13um-55nm	0.13um	0.11um-40nm	55nm-28nm
0.11um-40nm,95nm ULP	55nm,95ULP	55nm,95ULP	55nm EF	0.11um 55nm	95nm ULP

Frac./SS/PLL	Comparator	Ring OSC	Amplifier/PGA	DLL	Analog Filter
0.18um-40nm	95nm ULP,55nm	0.18um-55nm	95nm ULP	0.13um-55nm	0.18um-0.13um
0.18um-28nm	55nm EF	40nm,55nm			

ADC/DAC

SD ADC	SAR ADC	Pipeline ADC	Audio/Video DAC	Baseband/ WLAN AFE	Audio DAC/ Codec
0.35um-28nm	0.35-28nm	0.18um-65nm	0.18um-28nm	0.18um-65nm	0.18um-28nm
0.18um-28nm	0.13um-28nm	0.13um-28nm	0.18um-28nm		0.18um-28nm
55nm,40nm,95ULP	95ULP		0.13um-55nm,40nm,95ULP		

HS Interface

USB3.0/OTG	USB2.0/OTG	LPDDR1/2/3/4	DDR2/3/4	PCIe Gen 1/2/3/4	LVDS
0.13um-28nm	0.13um-28nm	65nm-28nm	65nm-28nm	65nm-28nm	0.18-28nm
28nm HK	0.13um-28nm	65nm-28nm	65nm-28nm	28nm	0.13um-40nm
		0.13um-28nm	0.13um-28nm		40nm

MIPI DSI TX	HDMI1.4	Display Port	SATA II/III	Ethernet	SerDes (up to 16G)
0.13um-28nm	0.18um-28nm	40nm-28nm	0.65um-28nm	55nm-28nm	40nm-28nm
					40nm-28nm

CPU Solution

ARM Cortex A53	ARM Cortex A7	ARM Cortex A9	ARM Cortex M0/M0+	CEVA TL421
28nm PS 1.3GHz	40nm 1.1GHz	40nm 1.3GHz	0.13um EF	55nm

CEVA XM4 Quad Core	CEVA DSP Core	AXI/AHB/APB/Arbiter/Bridge	Digital Peripherals
40nm-28nm	MM3101,X1643,TL420,etc.	0.18um-28nm	0.18-28nm

SMIC
The other third parties
Brite with customization service

Brite Owned IP & Service

Brite YouIP family

- **YouIP consists of 4 branches:**
  - YouPHY
  - YouRF
  - YouSiP
  - YouAnalog
- **YouSiP (silicon platform) includes:**
  - YouSiP-Audio
  - YouSiP-Vision
  - YouSiP-AP
  - YouSiP-IoT
  - YouSiP-IoM
- **Each platform is launched through silicon validated and product-like application proven**

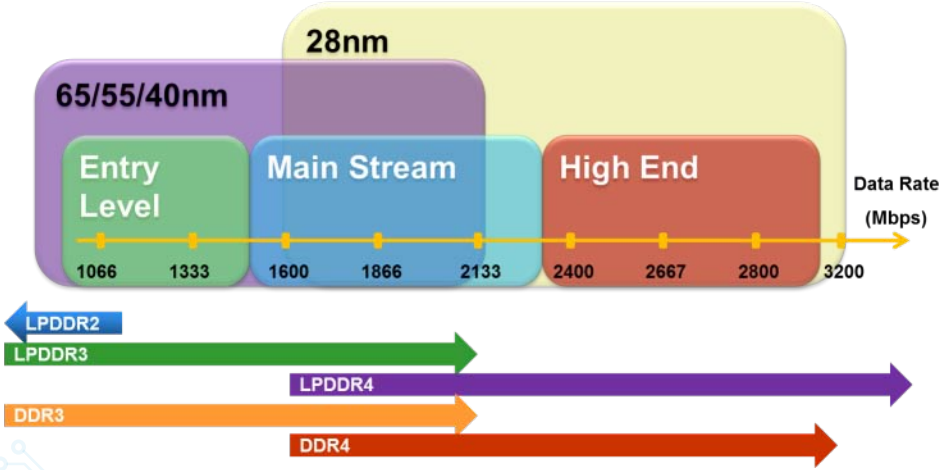
Brite YouAnalog IP

IP type	IP name	Description	Bits	Speed (MSPS)	Speed (KSPS)	Frequency (MHz)	Data Rate Mbps)	Power Sub（V)	Process	Status
ADC	B40NLL_PIPADC_12B170M	12bit 170MSps Pipelined ADC	12	170				1.1V	SMIC40	Silicon Proven
	B28HK_SARADC_12B125M	12bit 125MSps High Speed SAR ADC	12	125				0.9V	SMIC28	Silicon Proven
DAC	B40NLL_DAC_10B300M4CH	10bit 300MSps 4-Channel Video DAC	10	300				3.3V/1.1V	SMIC40	Silicon Proven
AFE	B40NLL_TPAFE_12B200K	Driver and digitizer for 4-wire or 5-wire resistive Touch Panel integrating 12bit SAR ADC	12	0.2				3.3V/1.1V	SMIC40	Mass Production
PLL	B55NLL_PLL_SSCG1P2G	Low Jitter Spread-Spectrum Clock Generator (SSCG)				VCO=200~1200 OUT=12.5~1200		1.2V	SMIC65/55	Mass Production
Audio Codec	B55NLL_AUDCODEC	Stereo ADC, Stereo DAC, Output Power Amplifier	ADC=16 DAC=24		8~96			3.3V/1.2V	SMIC65/55	Mass Production
LVDS TX	B40NLL_LVDS_ TX1P05G	high speed LVDS transmitter used for digital flat panel display systems					25~150 @CLK=25~150 1050 @throughput	3.3V/1.2V	SMIC40	Mass Production

Brite provides a complete DDR subsystem including not only controller, PHY and IO, also corresponding tuning and configuration software.

YouPHY-DDR is developed on 130um to 28nm process respectively and support LPDDR2, DDR3, LPDDR3, DDR4 and LPDDR4 combo PHY with the data rate from 667Mbps to 2933Mbps.

With patented dynamic self-calibrating logic (DSCL) and dynamic adaptive bit calibration (DABC) technology, YouPHY-DDR can automatically compensate chip/package/board/memory PVT variation and bit-bit skew.

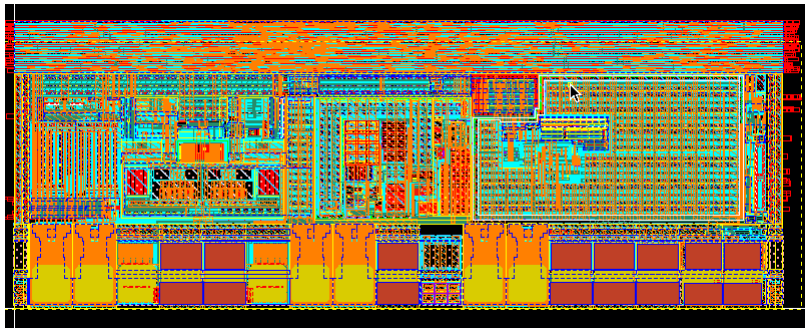


YouPHY-DDR Solution

Brite provides USB2.0 OTG PHY which is a complete mixed-signal IP solution designed to implement OTG connectivity for a System-on-Chip (SoC) design.

The USB2.0 OTG PHY supports the USB2.0 480Mbps protocol and data rate, and is backward compatible with the USB 1.1 1.5Mbps and 12Mbps protocol and data rates.

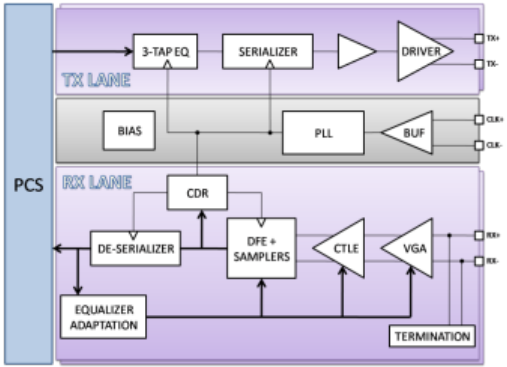
This solution can be adapted from 130nm to 28nm process. It has been verified by a number of end products, especially suitable for the internet of things(IoT) applications.



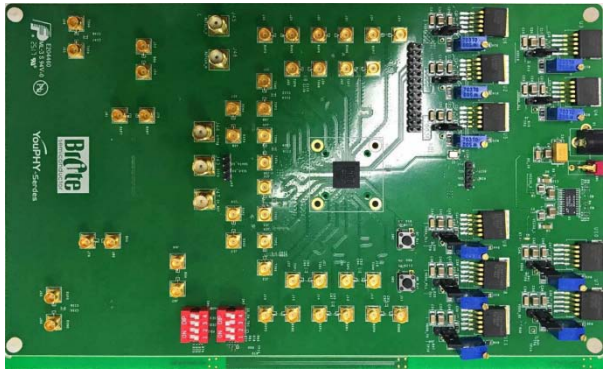
USB2.0 OTG PHY

YouPHY-Serdes provides 1.25-12.5Gbps multi-rate SERDES IP which is designed for smooth integration of multiple SERDES lanes offering best in class performance, area and power.

The programmable PHY supports major standards such as PCIe Gen 1/2/3, USB 3.0 / 3.1, XAUI, SATA Gen 1/2/3, CEI-11G-LR, 10GBase-KX4, JESD204B, SGMII/QSGMII, RAPID I/O, HSSTP (Trace Port), V-By-One, DisplayPort and HMC, based on advanced process as 40nm and 28nm.



YouPHY-Serdes Subsystem

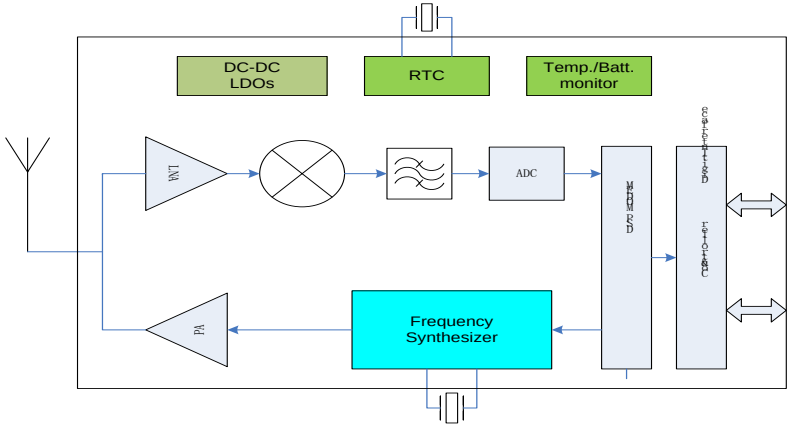


YouPHY-Serdes Demo Board

Brite provides a complete Bluetooth Low Energy (BLE) analog PHY.

The RF is a high performance 2.4GHz ISM band wireless transceiver. It integrates high sensitivity receivers, 5G PLL and high efficiency power amplifier, which can support 1Mbps GFSK modulation and demodulation. And can be combined with the Bluetooth smart baseband and controller to form a complete Bluetooth Smart solution.

YouRF-BLE is developed on SMIC 55nm LL process, support 0.9V-4.3V supply voltage with on-chip Buck-Boost DC/DC converter and LDOs, Low power consumption: RX<10mW; TX<12mW@0dBm



YouRF-BLE Block Diagram

YouSiP-Audio is developed based on the CEVA-TeakLite-4 DSP core and fabricated at SMIC's 55nmLP process, running up to 500MHz.

The platform provides designers with a powerful means to add 'smart and connected' capabilities to these devices, including always-on sensing, local processing and intelligence connectivity. The platform also provides real-time power measurement that allows developers to improve power consumption of system by optimizing their DSP software effectively.

It provides a complete development and demo system integrating DSP and multiple peripherals& interfaces IP, and supports diverse wireless technologies including Bluetooth Smart and Smart Ready, Wi-Fi, ZigBee and GNSS. It can be adopted on mobile, wearable, wireless speaker, smart home, surveillance, automotive and so on.

Voice Activated Audio Player DEMO

听不听话，您来说

触发 + 指令 （always-listening）
√ OK CEVA + Play Music
√ OK CEVA + Stop Music
√ OK CEVA + Next Song
√ OK CEVA + Previous Song

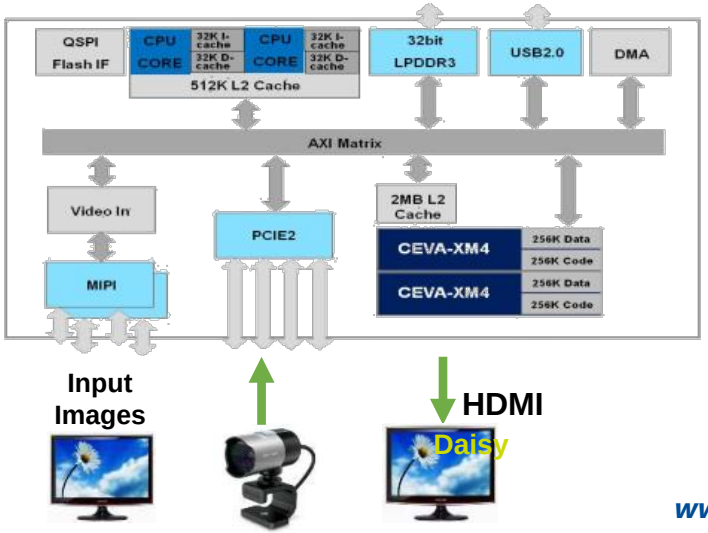
YouSiP-Vision

YouSiP-Vision is an image signal processer (ISP) platform integrated with CEVA XM4, and some high speed interface IPs as MIPI, PCIe, LPDDR3 and USB which is developed based on SMIC 28nm, 40nm process.

It can support 3D vision including real-time 3D depth map generation and point cloud processing for 3D scanning, computational photography algorithms including refocus, background replacement, zoom, super-resolution, image stabilization, HDR, noise reduction and improved low-light capabilities, visual perception including deep learning, object detection, recognition & tracking, context aware, augmented reality(AR) and others.

This platform targets any camera-enabled devices such as smartphones, tablets, ADAS and infotainment, robotics, security and surveillance, AR/VR and drones.

Real-Time CNN Object Recognition Demo



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YouSiP-IoT

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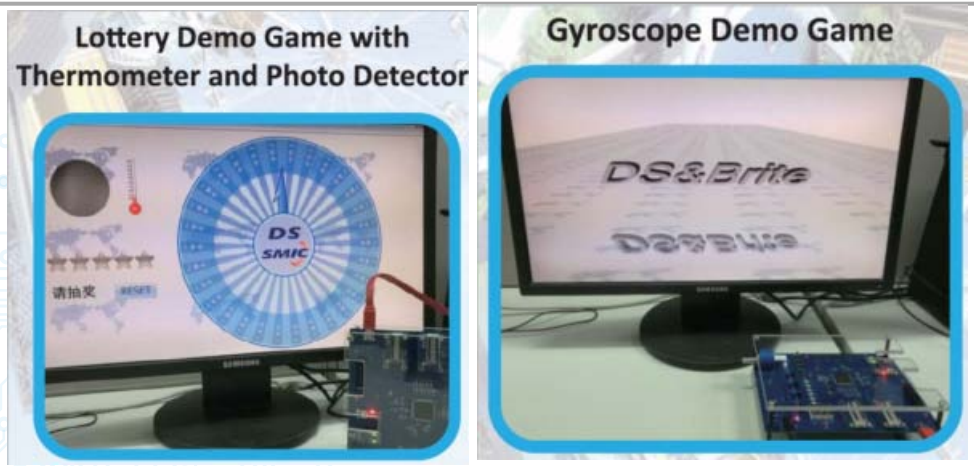
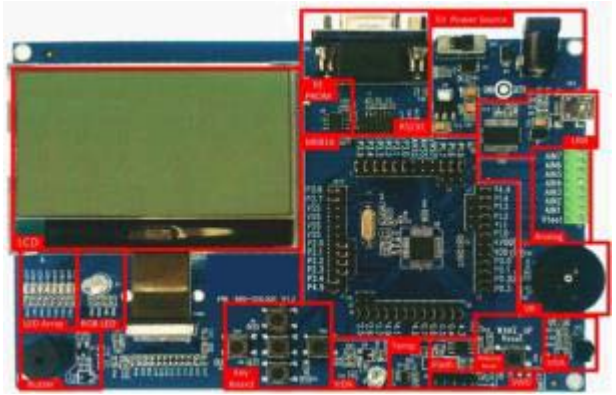
YouSiP-IoT (Internet of Thing) is a comprehensive platform solution designed for emerging application as IoT based on SMIC 55nm low leakage (LL) and 95nm ultra low power (ULP) process.

This solution integrates ARM Cortex Mx series MCU and CEVA TeakLite or MM series DSP, involves WiFi, Bluetooth/BLE interfaces, can connect to a series of different sensors.

YouSiP-IoT platform can assist customer to reduce the processing delay time, enhance the data security, improve the data rate and reduce power consumption of their SoC design, which is adopted in battery power supply environment as smart home, IoT and wearable devices with excellent low power management.



YouSiP-IoT Application Demo System



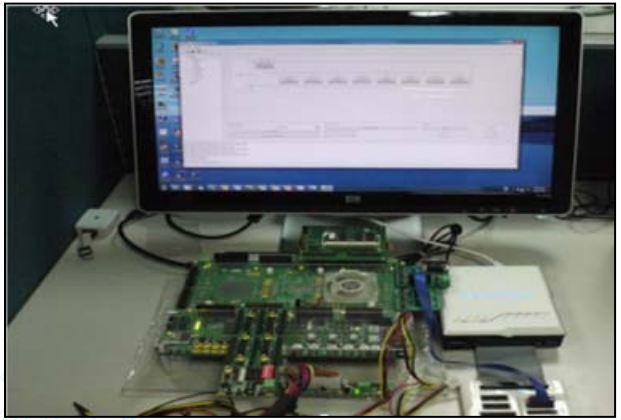
YouSiP-IoT Development Board

YouSiP-AP

Brite semiconductor

YouSiP-AP(Application Processor) provides an ARM Cortex-A series core architecture based SoC platform prototype which has been verified on SMIC 28nm and 40nm process.

Complete development tool including ISP/ICP tools, development boards, reference code and programmer and peripheral IPs can be offered to customer, enabling customer to achieve SoC product with shorter time to market and higher one time delivery rate, and assisting them win the emerging market opportunities in the field of industrial control, home appliance, security, toys, mobile devices, etc.



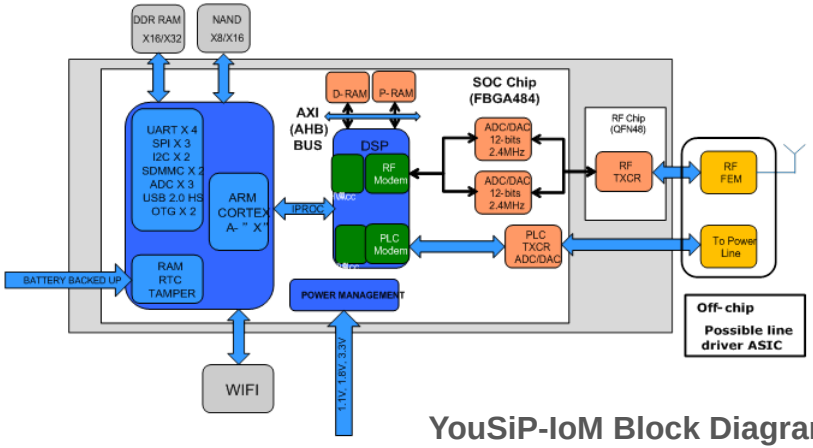
A9 FPGA Development Board

A9 Chip Testing Board

YouSiP-IoM(Internet of Meter) is an innovative interconnection SoC solution with SMIC 40nm LL process for smart meters.

YouSiP-IoM based on ARM Cortex A7 and Cadence Tensilica LX6 DSP architecture. Multiply transmission interface IPs are integrated to support industrial level wire and wireless connection as PLC, IEEE 802.15.4g and WiFi which can bring intelligent and connection to smart water, electricity and gas meters.

Abundant peripheral interface containing NAND Flash, LPDDR1/2, SD/MMC, USB 2.0 OTG, UART, SPI, I2C and RTC enable designer to extend sensing function and smart measuring technology and adapt product on various emerging applications and systems.



YouSiP-IoM Block Diagram

4

Summary

Summary

- ✓ **A close partner of SMIC/L Foundry and JCET, a bridge for supply chain localization on China**
- ✓ **Flexible business models and assist customer to shorter system to IC**
- ✓ **Complete offerings in platform, IP, design, and manufacturing as a one-stop service.**
- ✓ **High quality and on time delivery control**

THANK YOU !

A World-Leading ASIC Design Solution Provider

Email: sales_bs@britesemi.com

Tel.: +86 21 5037 6566