

The Software of Things

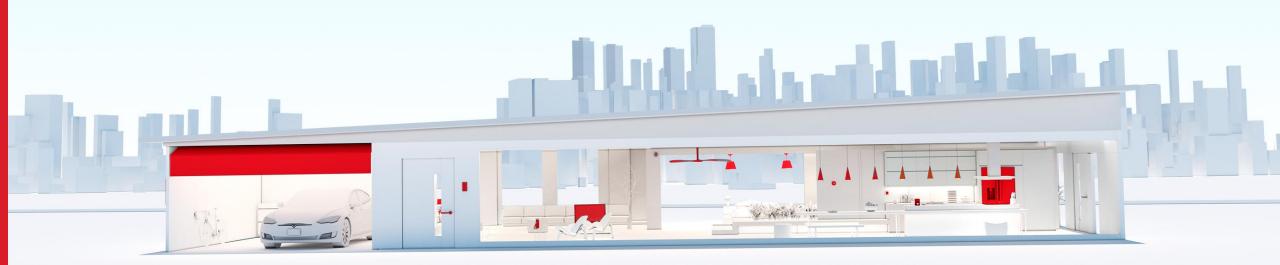
TYSON TUTTLE | CEO | SILICON LABS ASPENCORE CEO SUMMIT | SHENZHEN | 8 NOVEMBER 2018 "Most technology we've built so far was for the Internet of People (IoP). Whether it was an e-commerce or search application, it was built to serve people – and to accumulate specific types of data that we could analyze later.

But people are not things. Things produce vast amounts of data nonstop and can give us information whenever we ask for it. So why would we think the technology we built for the Internet of People would work for the Internet of Things?"

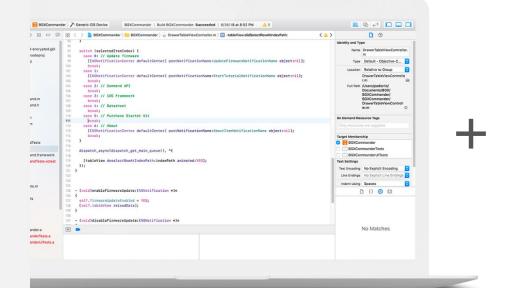
Timothy Chou Lecturer, Cloud Computing at Stanford Former President of Oracle Cloud



Silicon, software and solutions for a smarter, more connected world



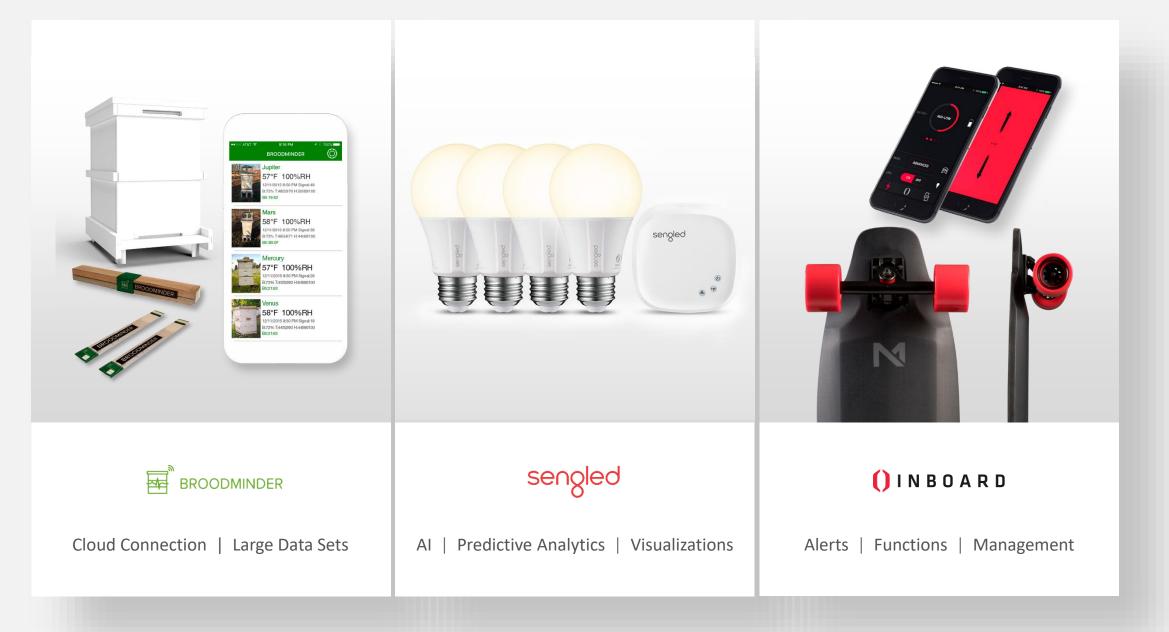
Connected Hardware + Software – A Powerful Combination





- Software defines the next generation of things
- Connected hardware requires more software
 - Wireless protocols
 - Apps, middleware, over-the-air updates
 - Abstraction of human controls
 - Sensor data processed, sent, stored and secured
- IoT device lifecycle needs reliable software

Connected Hardware + Software – Enabling New Applications



Connected Hardware + Software – Transforming Industries



Economic Impact

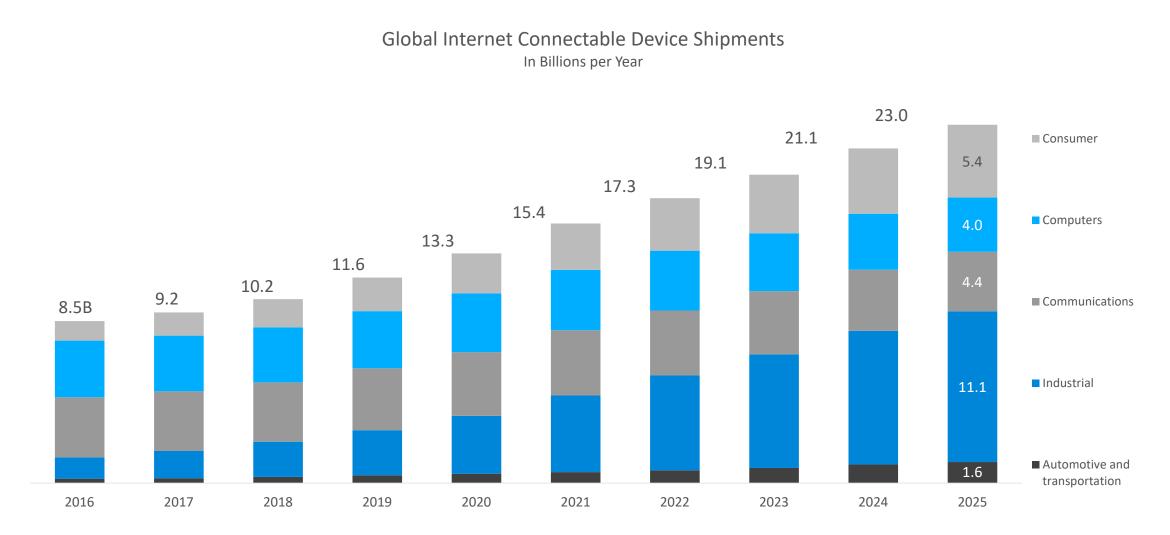
IoT Revenue

\$1T

\$100B

Silicon, Software and Solutions TAM

Fueling the Growth of Connected Devices

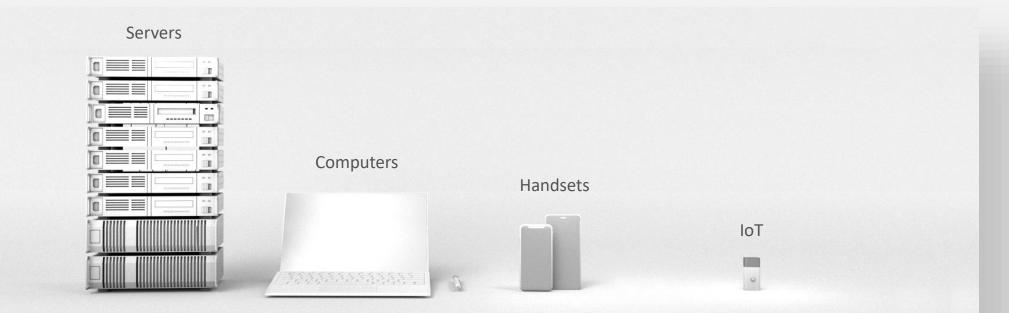


Source: IHS Markit Q2 2018 Report

IoT Creates New Business Models

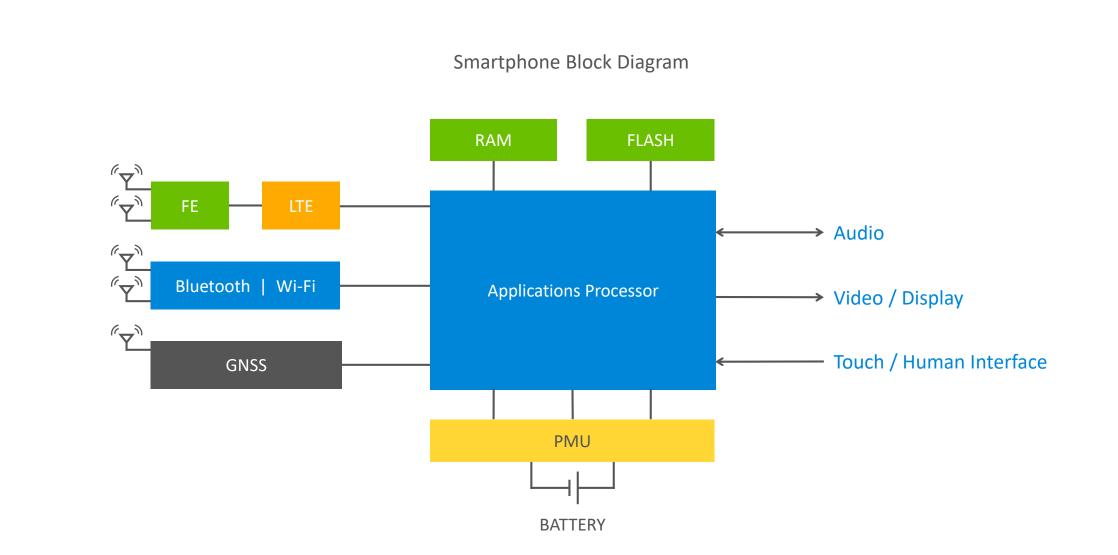


IoT Applications Have Significant Constraints

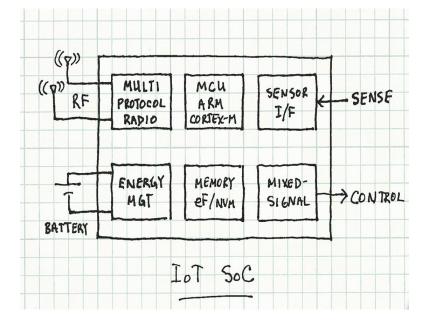


PB	ТВ	GB	MB
kW	100 W	10 W	μW
AC Powered	100 Wh/1 day	10 Wh/1 day	1 Wh/10 years
\$10,000	\$1,000	\$100	\$10
	kW AC Powered	kW 100 W AC Powered 100 Wh/1 day	kW 100 W 10 W AC Powered 100 Wh/1 day 10 Wh/1 day

Integrating Wireless Connectivity Is Hard



IoT SoCs Integrate Wireless Connectivity



2014 IoT SoC Concept



2018 EFR32xG1x SoC Portfolio

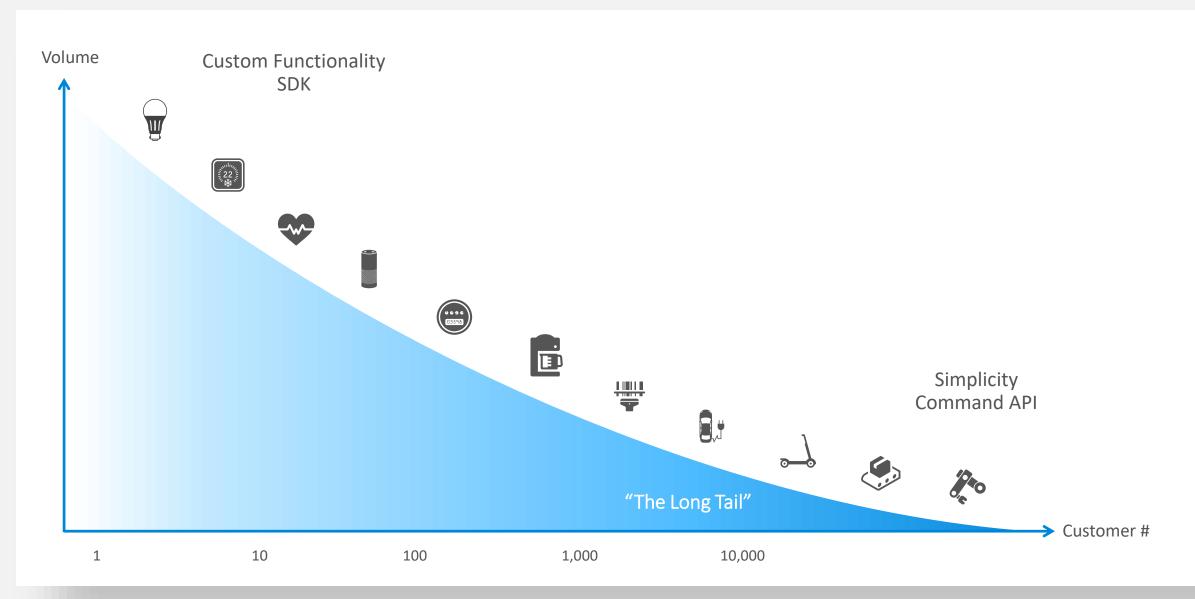
IoT SoCs Integrate Wireless Connectivity

CPU and Memory			Clock Management		Energy Management		ent	Security		
ARM Cortex-M4 w/ FPU + MPU	32 to 10	32 to 1024 kB Flash	ETM	High Freq Crystal Osc	High Freq RC Osc	Voltage Regulator	Voltage Monitor		Crypto AES, ECC, SHA	
				Auxiliary RC Osc	Ultra Low Freq RC Osc	DC-DC	Brown-out	CRC	CRC32	
Debug 8 to 25 Interface RAM		6 kB LDMA Controller		Low Freq Crystal Osc	Low Freq RC Osc	Converter	Detector	Detector		
				Precision Low Freq RC Osc (Replace External 32 KHz XTAL)		Power-on Reset		TRN	TRNG	
					32-bit bus					
				Perin	heral Reflex System					
C	erfaces	1/	O Ports	Timers	and Triggers	Analo	g Modules	R	adio	
Serial Inte			3x Timer/	Low Energy Timer	ADC	2x Analog Comparators	2.4 GHz (int. balun)	Sub-GHz		
4x USART	Low Energy UART			Counter			comparators	· · · · ·		
4x USART			GPIO (5V Tol)	LESENSE	Watchdog	IDAC		Integrated PA	Radio	
4x USART					Watchdog Protocol Timer	IDAC VDAC & OPAMP	Cap Sense		Radio Controller	

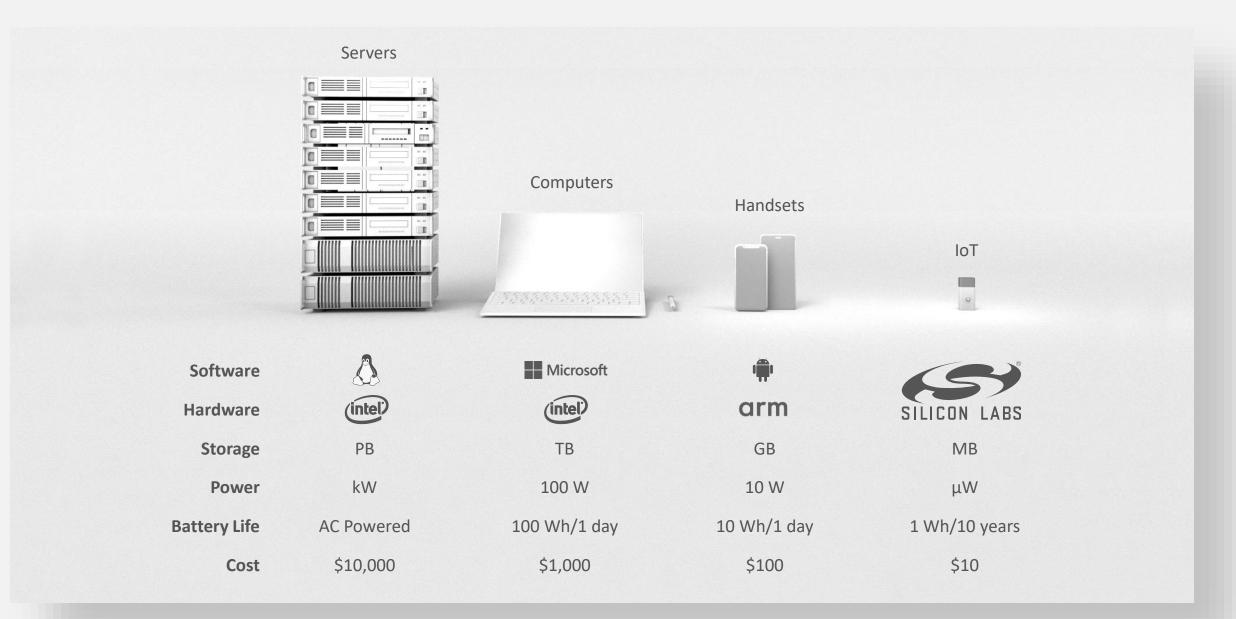
The Best Software Will Decide the IoT's Future



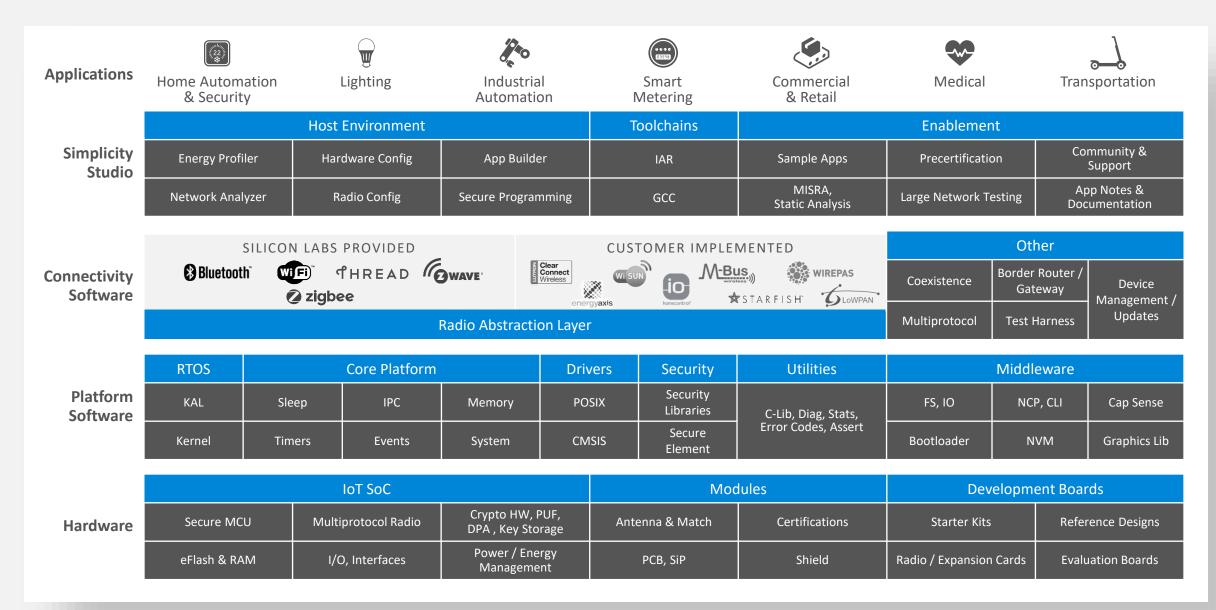
Models for IoT Software Development



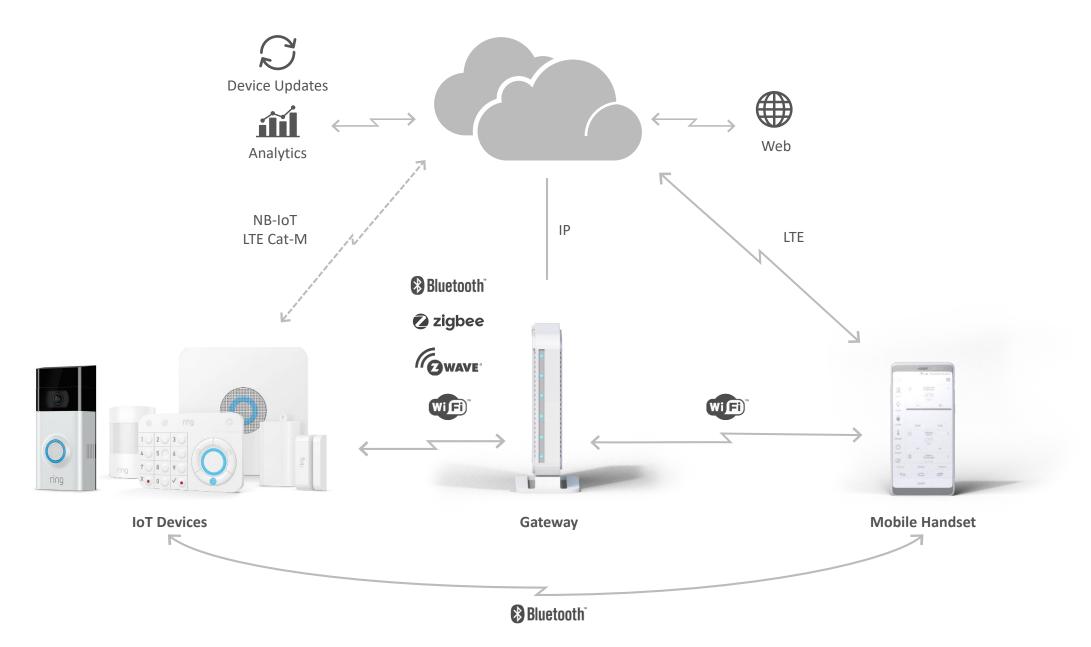
IoT Requires Integrated Hardware + Software



Integrated Gecko Hardware + Software Platform



Connected Hardware + Software – Silicon to Cloud



Key Takeaways



- Software unlocks the value of IoT from silicon to cloud
- There will be many hardware + software platforms enabling the IoT in China and globally
- Market success requires highly optimized, tightly integrated platforms that meet the constraints of IoT
- IoT winners will be those who collaborate for the benefit of all





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