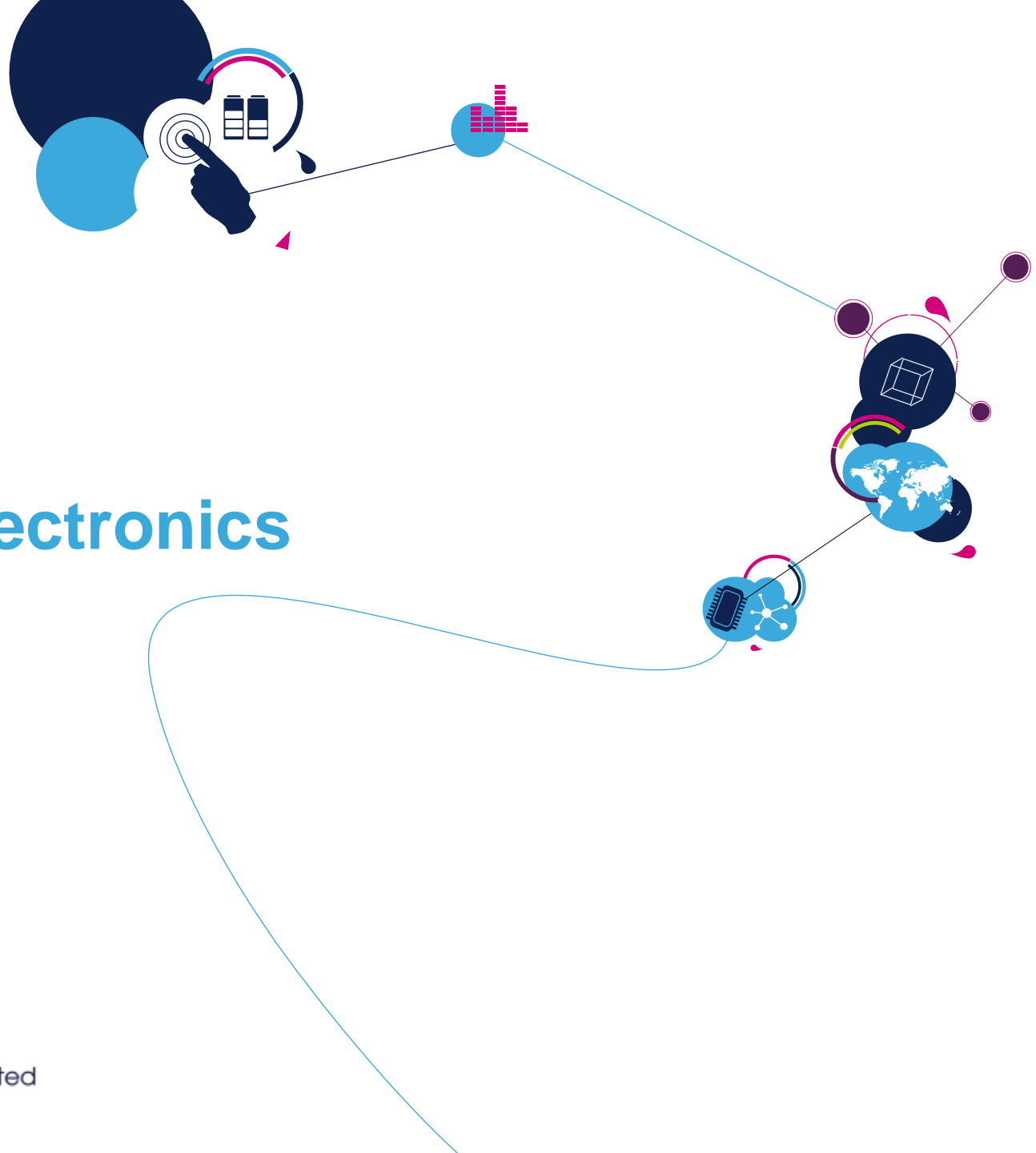


STMicroelectronics

Marcello Coppola



Where you find us

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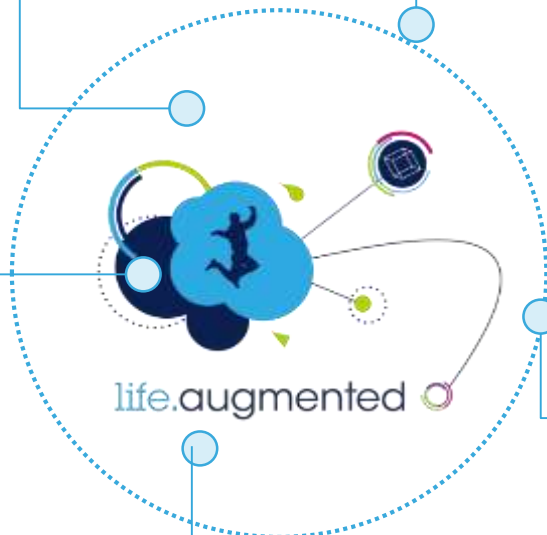
Our MEMS & Sensors
are augmenting
the consumer experience



Our digital consumer products
are powering the augmented digital
lifestyle



Our automotive products
are making driving safer,
greener and more
entertaining



Our Microcontrollers
are everywhere
making everything smarter
and more secure



Our smart power products
are allowing our mobile products to operate longer
and making more of our energy resources

- Introduction
- STM32 Portfolio
- STM32 Ecosystem
- Case Study
- Conclusions



Success with an Open Platform

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- > 1.5 Billions STM32
- > 700 000 kits in the Field
- > 100 000 yearly STM32CubeMx download
- Open source
 - Robust, Tested, Field proven , Maintained and OPEN source Firmware
- The most permissive and protecting licenses
- A vast choice of Development Environment
- Open Hardware → ARM based





STM32 Portfolio



Select the best partner

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STMicroelectronics is leading the market



Pioneer in introducing a full range of ARM® Cortex®-M cores

Market-share leader in ARM® Cortex®-M

Owner of the largest Cortex®-M portfolio

Reliable industrial partner able to guarantee 10 years lifetime

Expert in ultra-low-power, performance and cost-efficiency



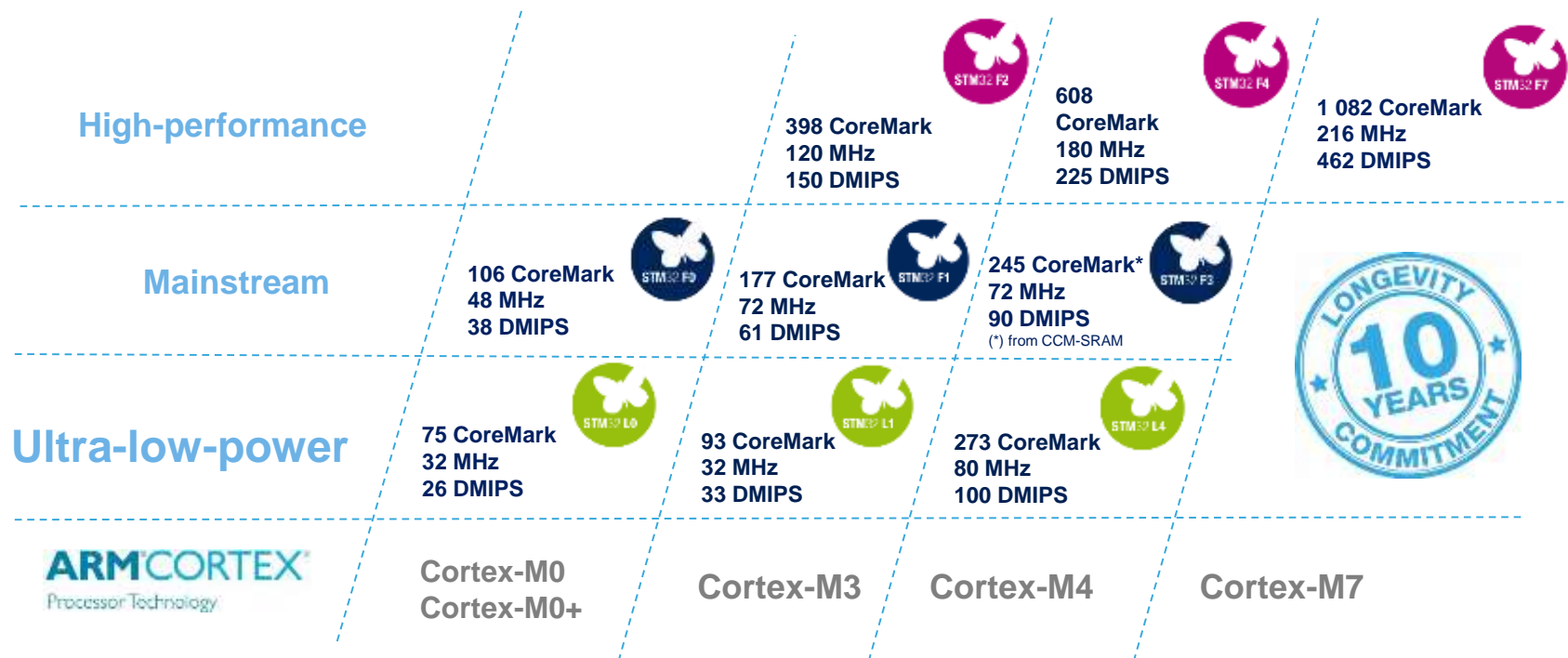
+



STM32 wide portfolio

7

9 product series / more than 32 product lines - More than 600 p/n select





STM32 Ecosystem

STM32 ecosystem

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Hardware tools

STM32 Nucleo boards



Flexibility prototype

Discovery kits



Creative demos

Evaluation boards



Full-feature evaluation

Software tools

STM32CubeMX



Configure and generate code

Partners IDEs



Compile and debug

STMStudio



Monitor

Embedded software

STM32Snippets*



High integration
low portability

STM32Cube and Std libraries



Average optimization
STM32 portability

CMSIS and mbed SDK

ARM mbed

Low optimization
ARM portability





Virtual machine and models

STM32Java



Low optimization
large portability

Hardware tools 10

	 STM32 Nucleo	 Discovery kits	 Evaluation boards	 3rd parties
Typical use case	Flexible prototyping, Community	Prototyping, Creative demos	Full feature evaluation	From full evaluation to open hardware
Extension possibilities	+++	++	+++	
Connectivity	Arduino™ ST Morpho	ST	ST	
	\$10	\$10 - \$60	\$250 - \$450	



Case Study

Threats on IoT devices

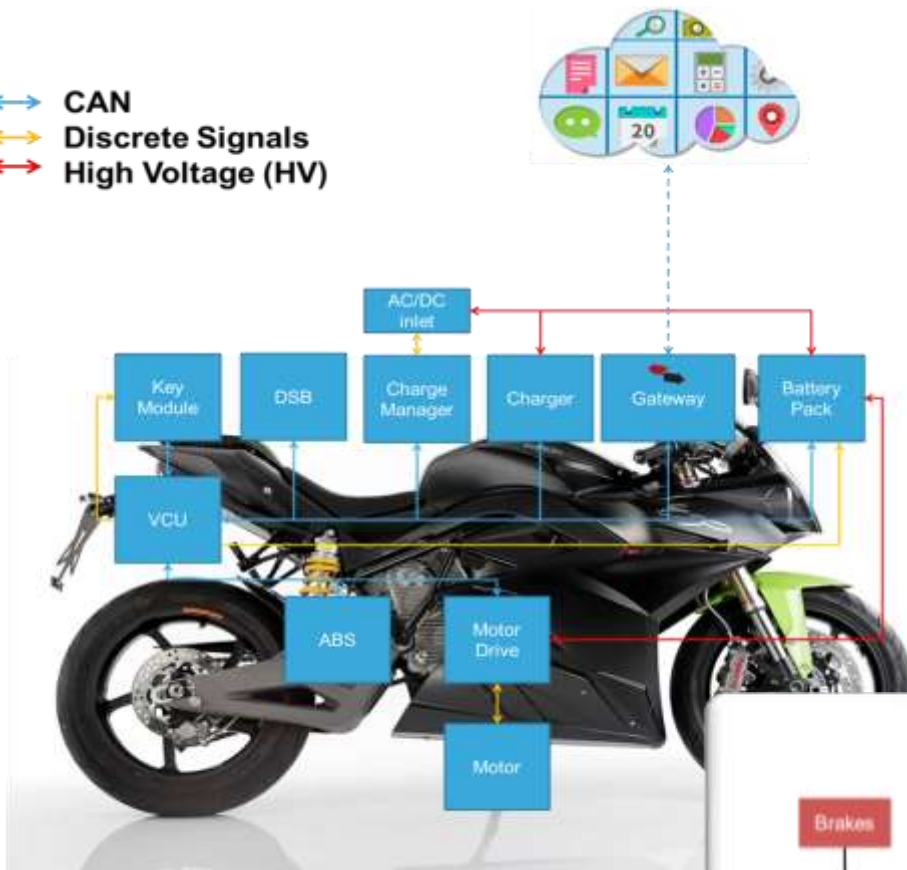
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- Everything becomes “smart”...



- ... and threat is on everything
 - Control of device
 - Smart door locks (cars, houses)
 - Home lighting systems
 - Car brakes control
 - Steal personal information
 - Personal fitness device
 - Healthcare data
- Disrupt services
 - Healthcare systems (pumps, pacemakers!)
 - Pacemakers!
- Steal software
 - Application/device duplication
 - SW IP cloning

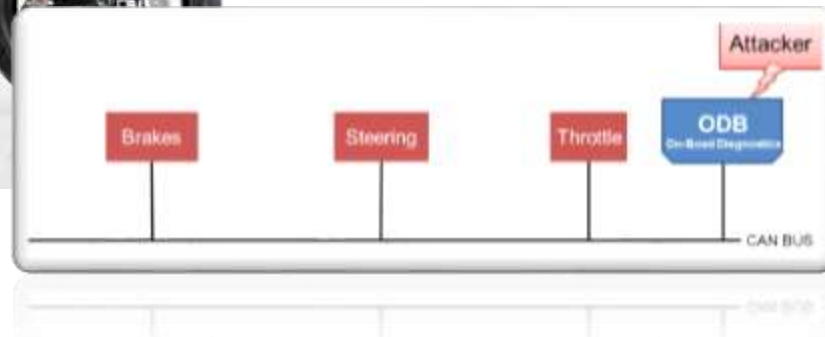
- ↔ CAN
- ↔ Discrete Signals
- ↔ High Voltage (HV)



Communication interception



- Man-in-the-middle attack
- Eavesdropping
- ID Usurpation



From Prototype to Products

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Develop and test the software (sCan firmware)



Build a prototype using 3D printing & test on the field



Make a Product



sCAN

Steering

sCAN

Throttle

sCAN

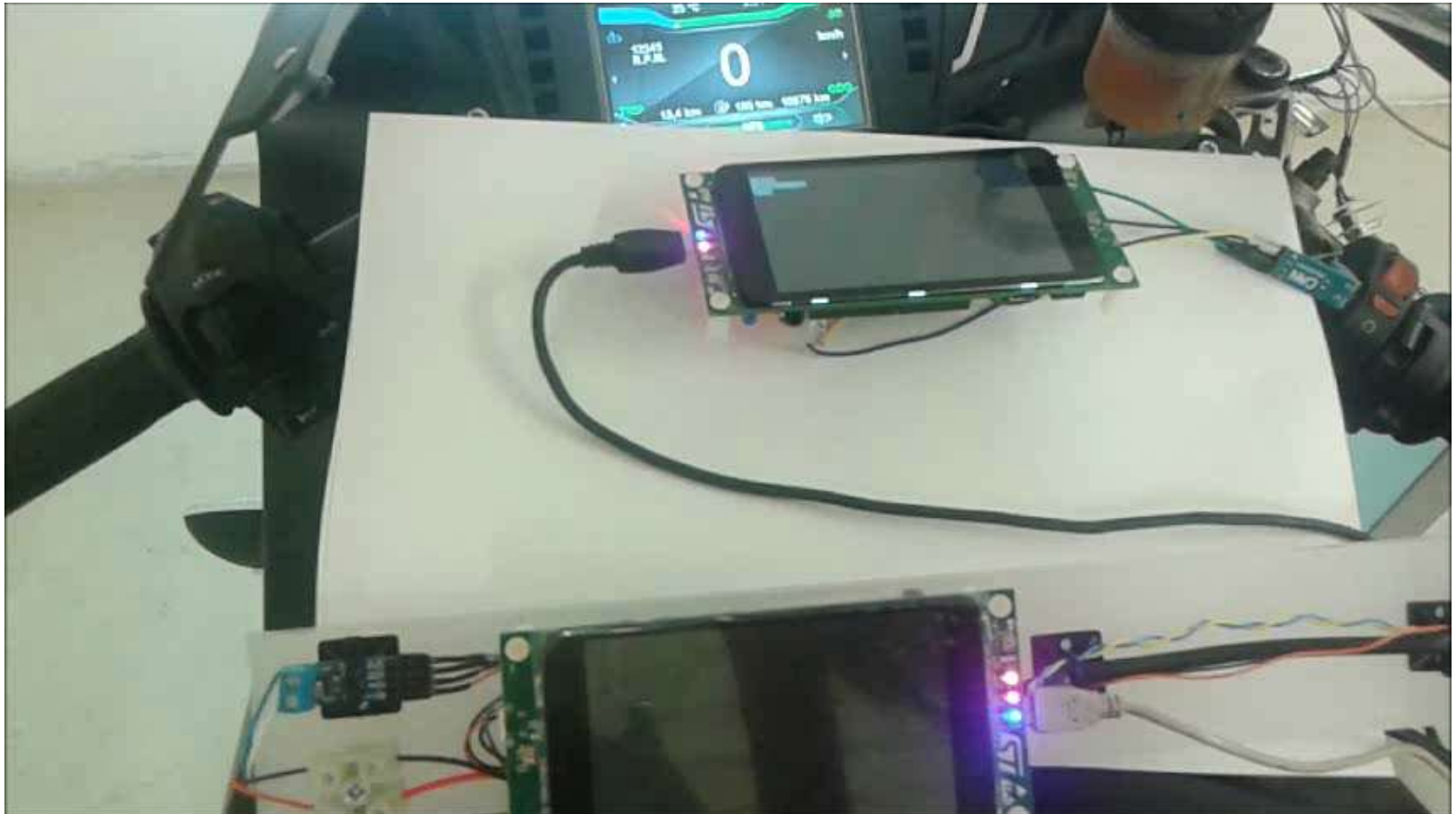
ODB

On-Broad Diagnostics

Attacker





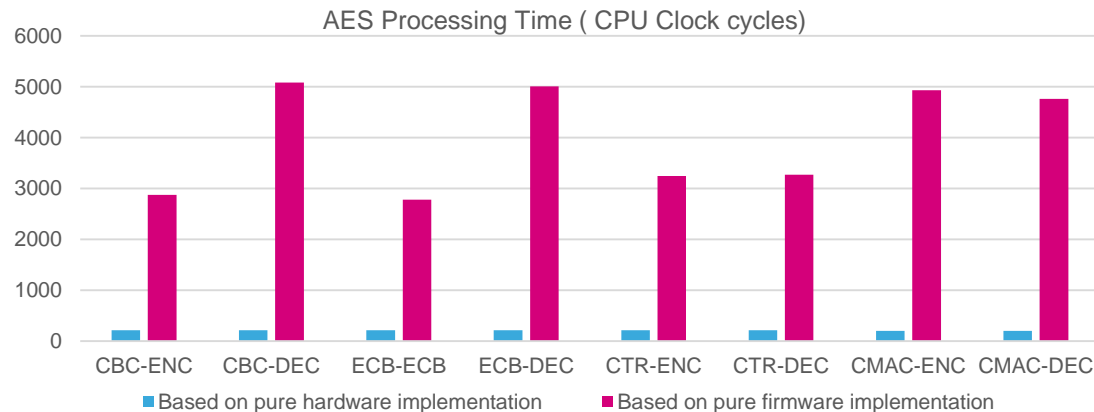


IoT Security Challenge

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How to conjugate security with realtime and energy efficiency

- sCAN based on the AES algorithm HW block in STM32L4
 - AES is the main contributor to encrypted transfers
 - Dedicated HW peripheral enables drastic power efficiency



Algorithm	Pure Hardware Implementation	Pure Firmware implementation
AES-ECB consumption	13,5(mA) during 2.6μs	10,5(mA) during 34μs

Energy gain : x10 ratio SW/HW !

Fostering the Innovations of Tomorrow

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To learn more please send an email to ***marcello.coppola@st.com***