



Test Forum – Economics Perspective at Test Test Development Economics

Michel Villemain – Presto Engineering



We are developing the

Semiconductor Supply Chain

for today and tomorrow's Internet of Things applications







You Design it. We Produce it.™

At A Glance

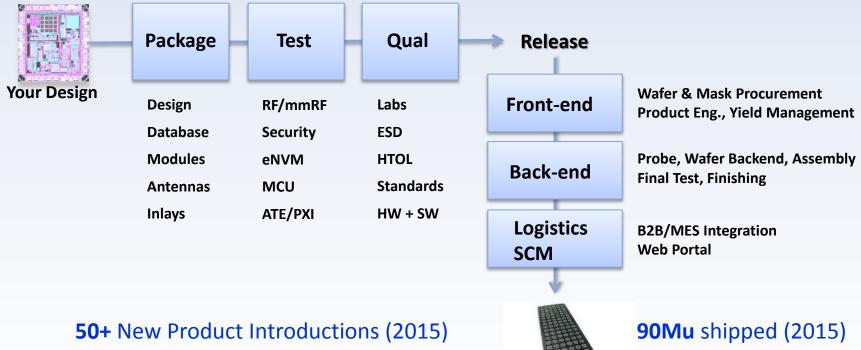
SAN JOSE

MEYREUIL Semiconductor Experts 100+ CAEN 400+ **Served Customers GRENOBLE Millions Units Shipped** 100+ **BANGKOK World-Wide Operations** 8 **KAOSHIUNG CAGR 2007-15** 35% **SUKALUYU HONG-KONG**



Engineering & Production





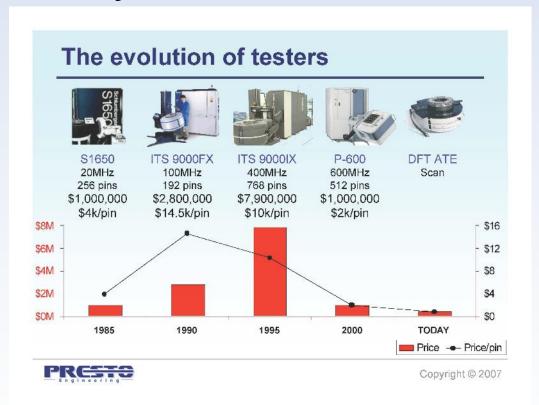


This Was Yesterday...

San Jose
State University

EE Department

2007

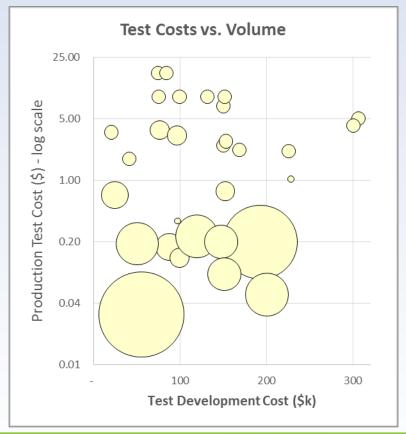




Today

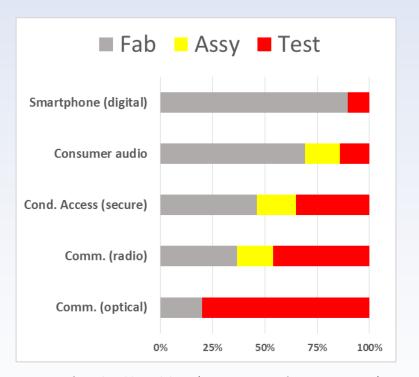
- HSC (RF >20GHz) vs. AMS
- New vs. repeat
- Characterization
- Digital content
- DFT

(Sample of Presto's projects 2015-16)





Two Sides To This Story



High-End	"loT"
Digital	MXSL + RF + Sensor
Adv. CMOS	Legacy Process
High Pin Count	Integration
Dig + Mem	Analog + RF + HVM/Perso

IC Cost of Goods Sold Breakdown (Source: company's projects in 2015)

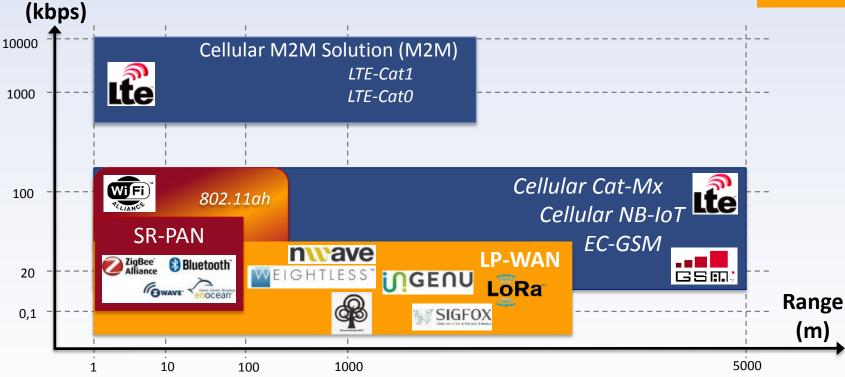


IoT - Reach/Data Rate = RF

SR-PAN

Cellular

LP-WAN





Data Rate

IoT Markets

SR-PAN

Cellular

LP-WAN



Connected Infrastructures Predictive Logistics / Maintenance Goods tracking



Climate-Agriculture monitoring Flood monitoring & alert Environmental monitoring (Pollution)



Connected Autonomous Car Fleet Management eCall - Regulatory Security V2x



2020

Where IoT will be



UTILITIES

Smart metering Smart grid management Distribution control

SMART CITIES

Parking sensors Smart bicycles Waste management Smart lighting



Smoke detectors Alarm systems Home automation

CONSUMERS

Wearables Kids/Elderly tracker Medical monitoring

INDUSTRIAL

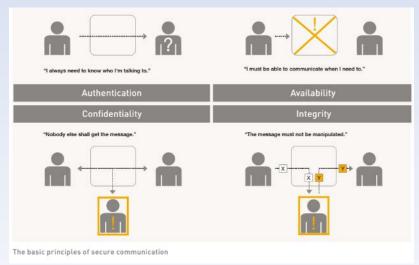
Process Monitoring & Control Manufacturing Automation Factory

Ericsson AB 2016-03-10 | Analysys Manson 2015 | Gartner 2015 | Presto Engineering



Security



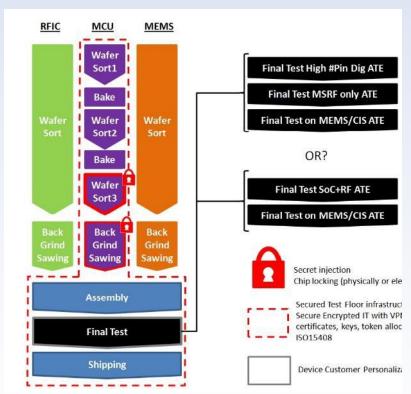


Source: Gemalto, 2016

- HW Security = Provisioning = writing to NVM
- Probe vs. Final vs. Module
 - Protocol (bandwidth) vs. size (key/OS)
- No parallelism



Security/provisioning = Test

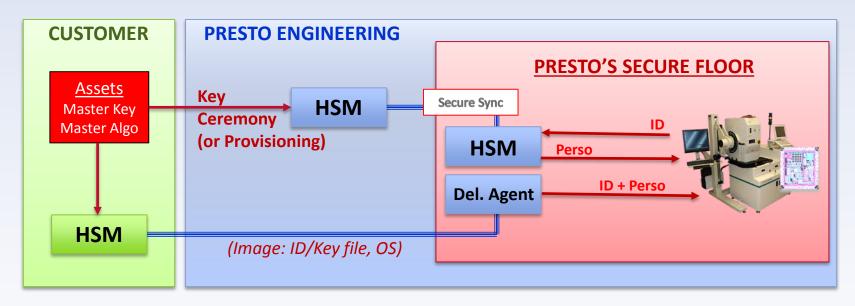


Requirements:

- EAL 5+/6
- Secure network
- Secure (local)
 computer room
- Secure floor
- (DRP)



Secure Personalization/Provisioning



Meyreuil (EUR) Bangkok (THA), Kaohsiung (TWN)

Presto's Proprietary, Secure Network



Test Cost Drivers

Tester – to a point

- ATE vs. bench vs. parallelism
- (Probers) and handlers

Test time – a lot

- Analog/RF vs. parallelism
- Security/provisioning
- Probe vs. Final vs. Module/Assy



Managing Test Costs

DFT -> Early Test Strategy

- It's the economy, …!
- Balance engineering (charac/qual) vs. production

Anticipate new requirements

- RF: performance vs. compliance
- Security/provisioning

Build the right model

- Test flow vs. yield vs. volume vs. rates
- Custom test hardware solution
 - Probe card, loadboard, tester, test cell





THANK YOU

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