



## 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

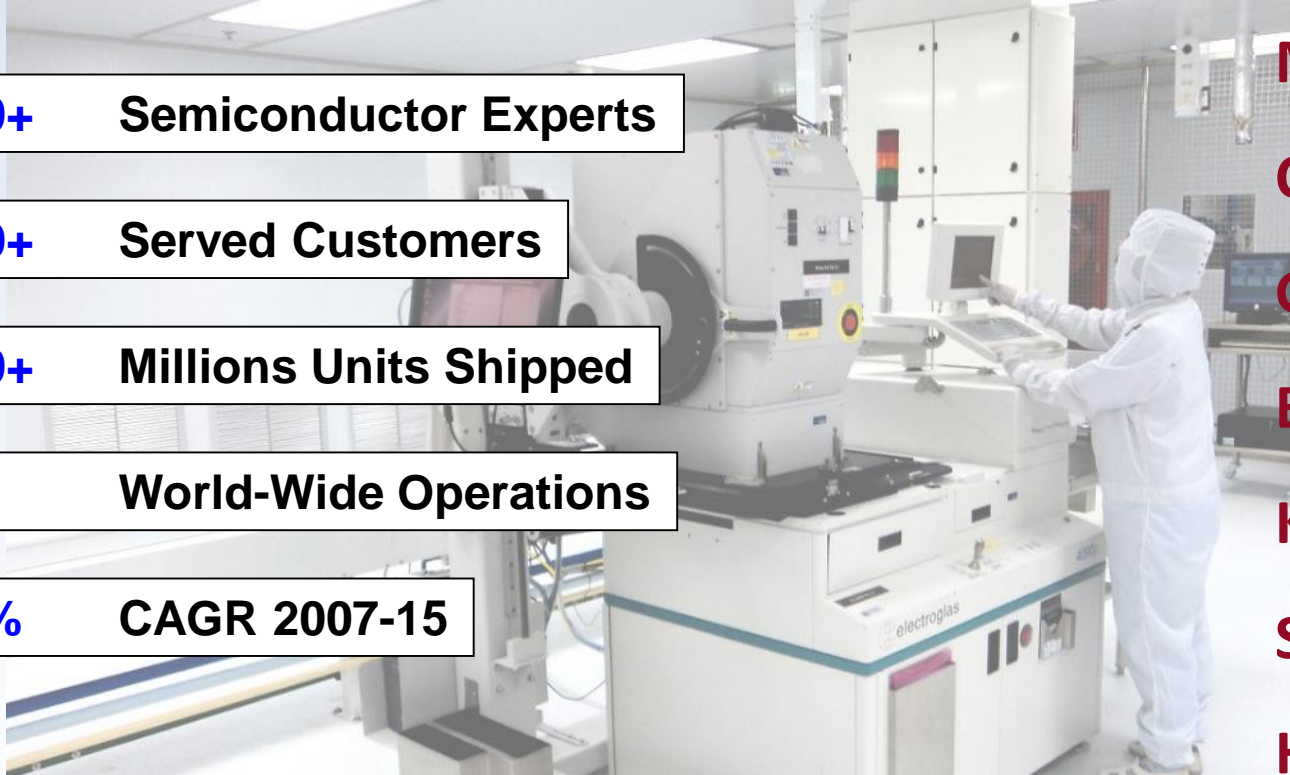
**100+** Semiconductor Experts

**400+** Served Customers

**100+** Millions Units Shipped

**8** World-Wide Operations

**35%** CAGR 2007-15



**SAN JOSE**

**MEYREUIL**

**CAEN**

**GRENOBLE**

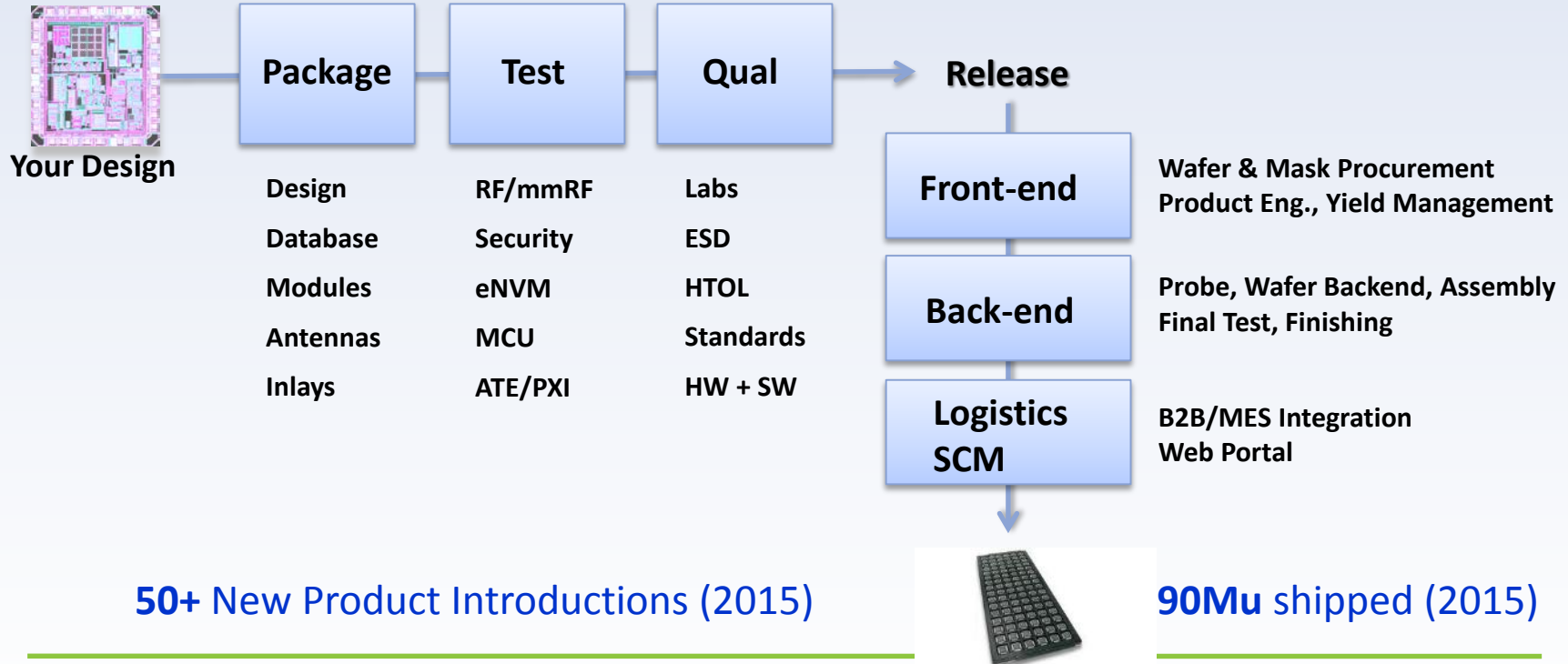
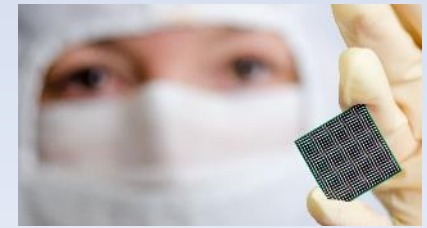
**BANGKOK**

**KAOSHIUNG**

**SUKALUYU**

**HONG-KONG**

# Engineering & Production

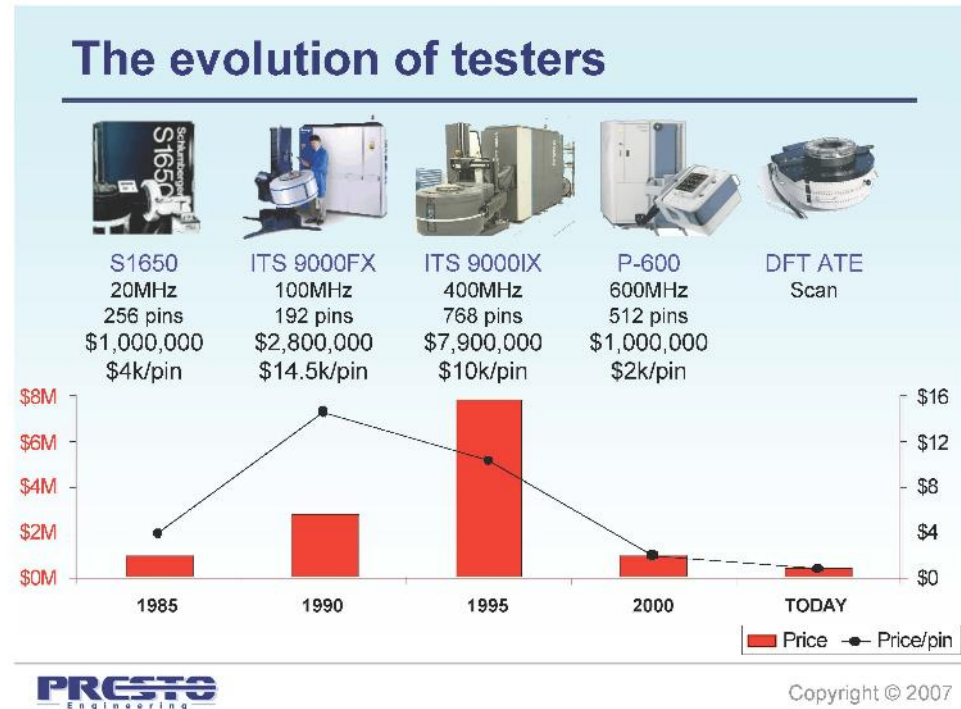


# This Was Yesterday...

San Jose  
State University

EE Department

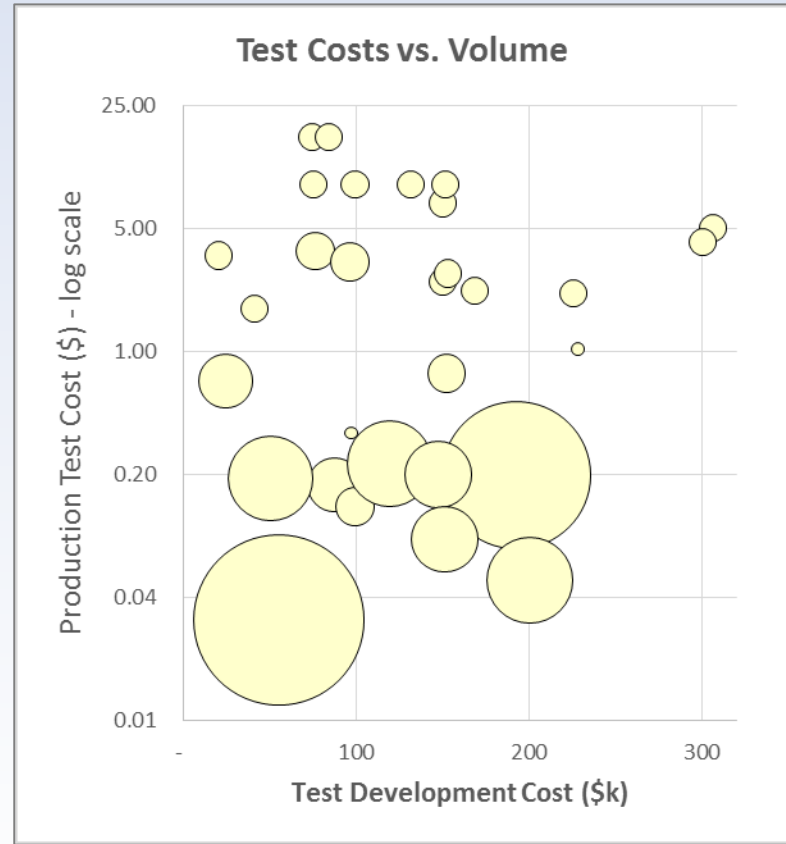
2007



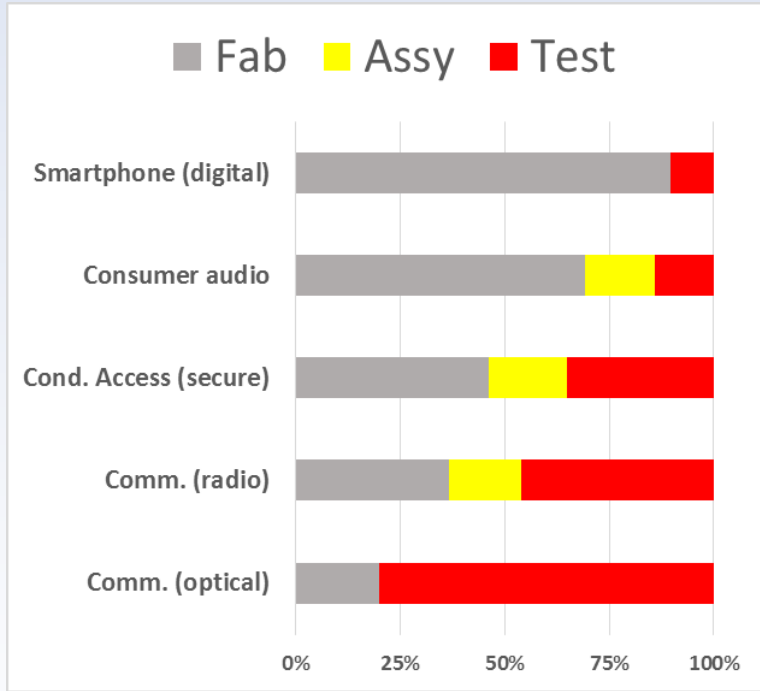
# Today

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

*(Sample of Presto's projects 2015-16)*



# Two Sides To This Story

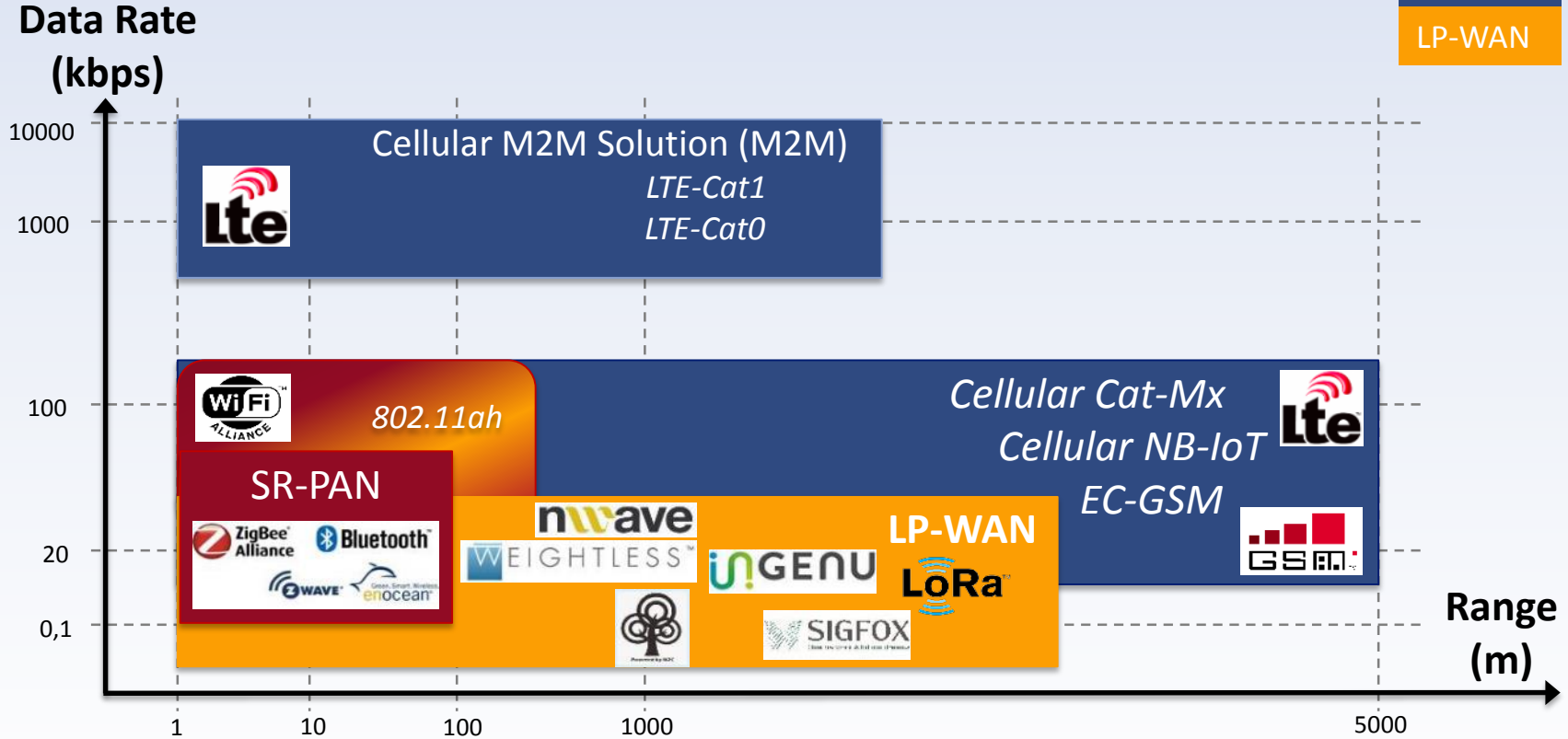


IC Cost of Goods Sold Breakdown (Source: company's projects in 2015)

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

# IoT – Reach/Data Rate = RF

SR-PAN
Cellular
LP-WAN



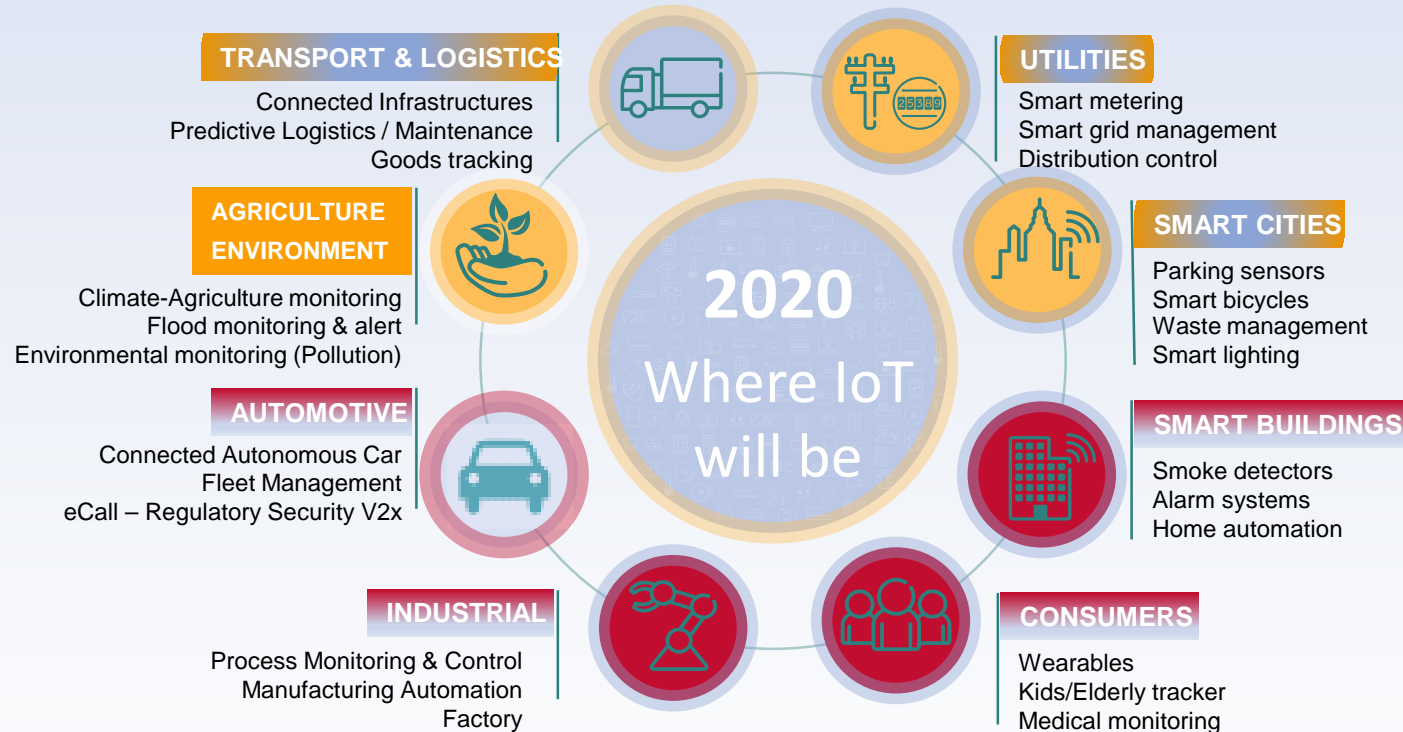


# IoT Markets

SR-PAN

Cellular

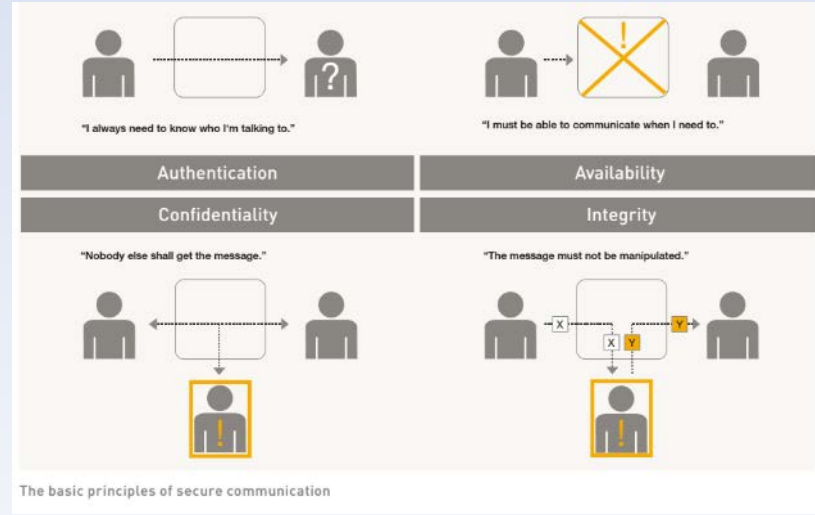
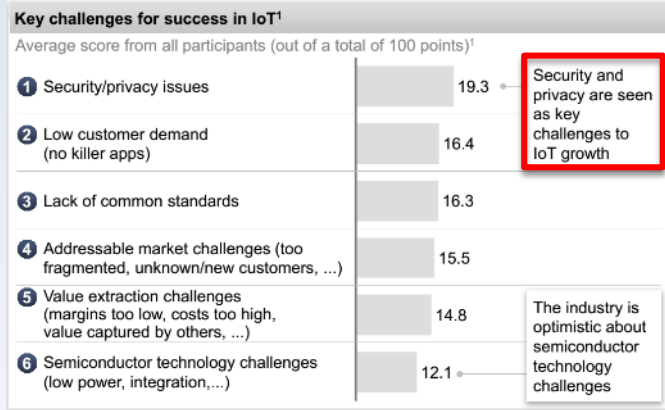
LP-WAN



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

# Security

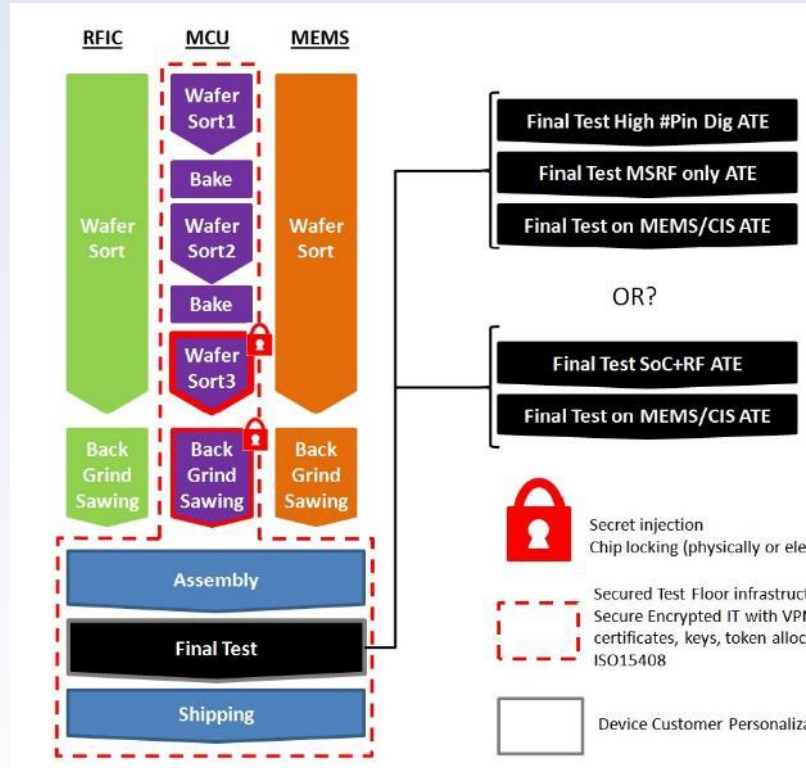
Source: McKinsey, GSA 2015



Source: Gemalto, 2016

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

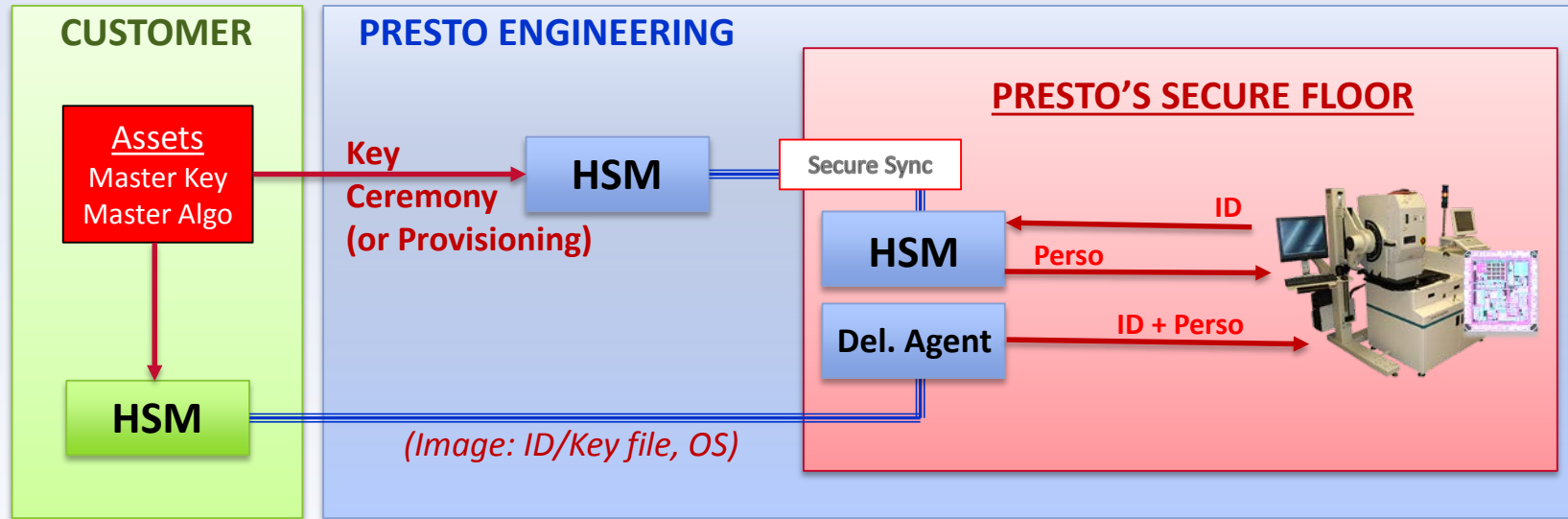
# Security/provisioning = Test



## 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**

**PLEASE CONTACT US: [INFO@PRESTO-ENG.COM](mailto:INFO@PRESTO-ENG.COM)**

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