The Internet of Trust and a New Frontier For Exploration

How FPGA-based Prototyping Evolves From Functional To Use Case Verification

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From Things to Trust

- Things are merely Intelligent
- Devices have to be TRUSTED
- Consumers will tell everyone
- Industrial apps are "–critical"
- Data and perceptions live forever



Trust is the new frontier

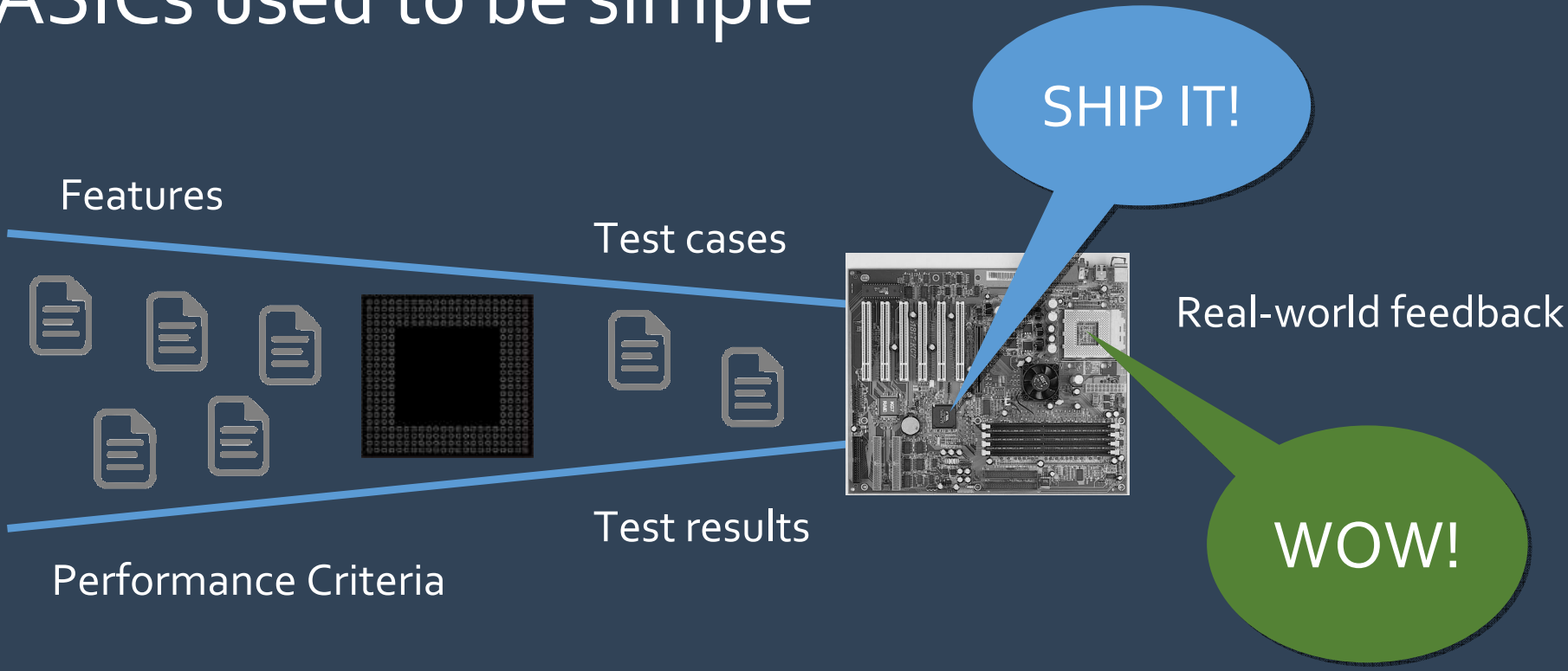
Privacy = who is allowed to see data

Security = protecting data from harm

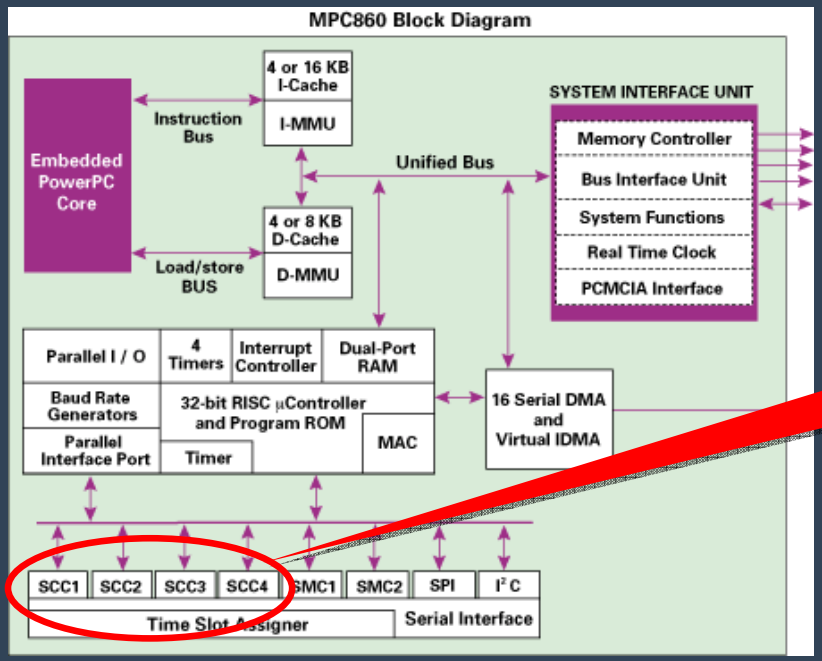
Trust = emotions and implications

#UX → #IoT

ASICs used to be simple



Then we invented SoCs

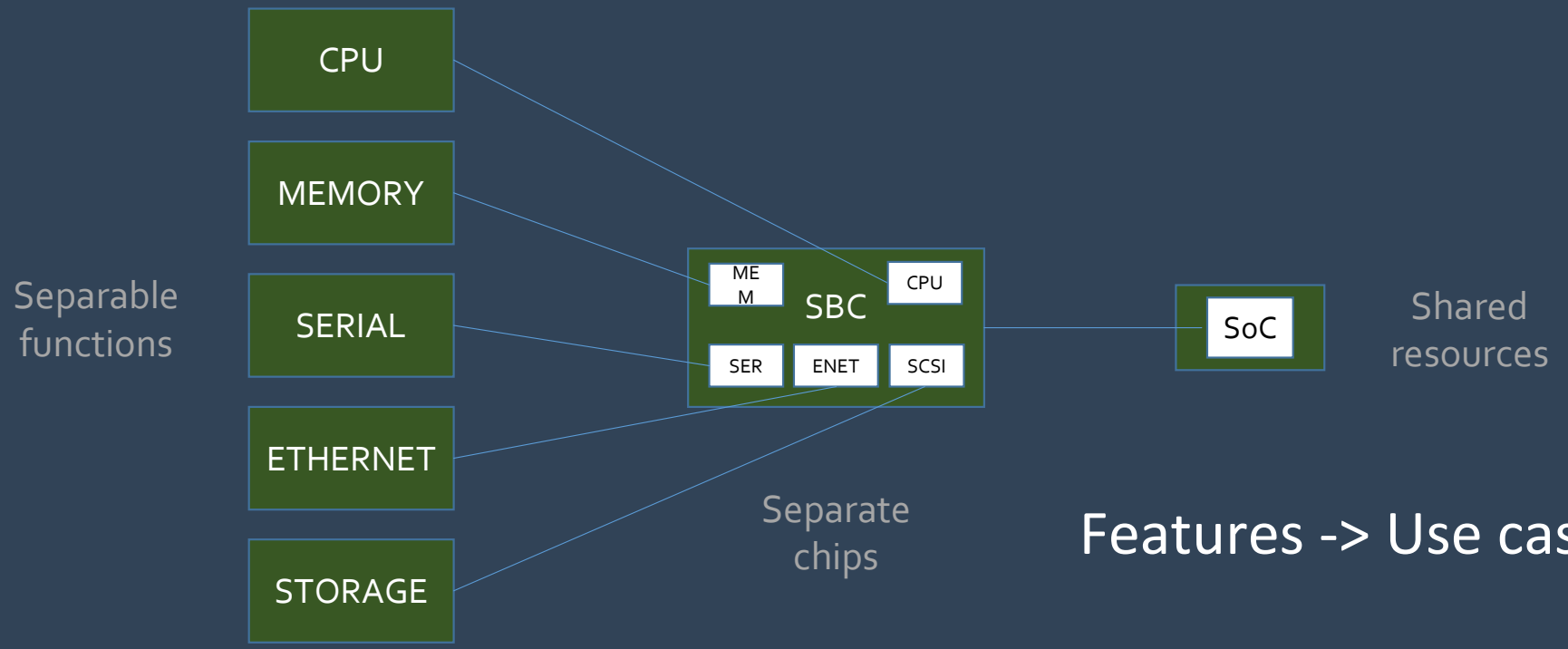


Functional verification

WHAT?

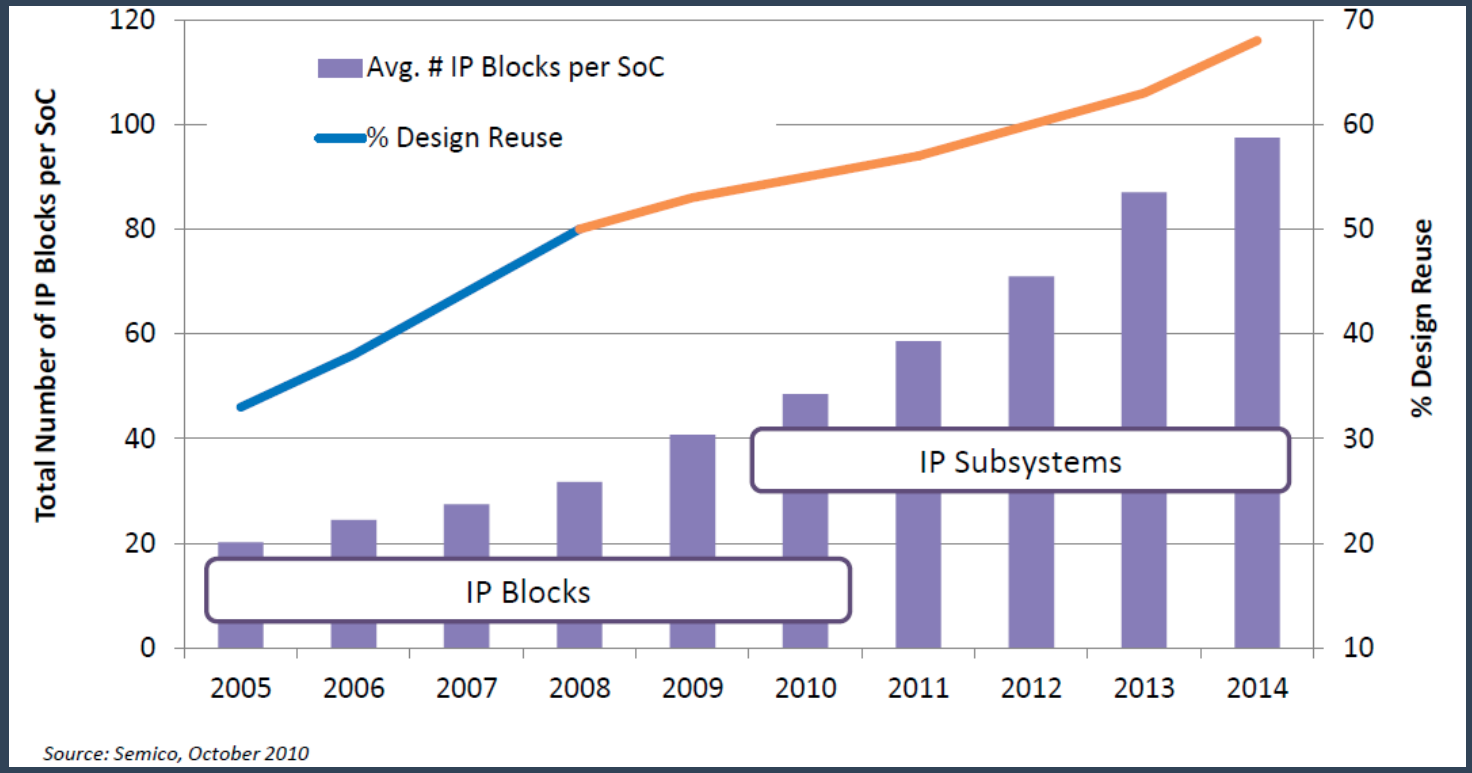
RTFM is the ultimate no-win scenario

Integration fixation



Features -> Use cases

Multimedia drove complexity



Build-borrow-buy factors in

- How well do you really know your IP?
  - If you *build* it, you probably test it
  - If you *borrow* it (reuse), hopefully somebody tested it
  - If you *buy* it, did they test it the way you use it?
  - When you integrate it, does it work the way it did?
  - When they use it, what happens?

TRUST

Co-verification arrived

TIZEN

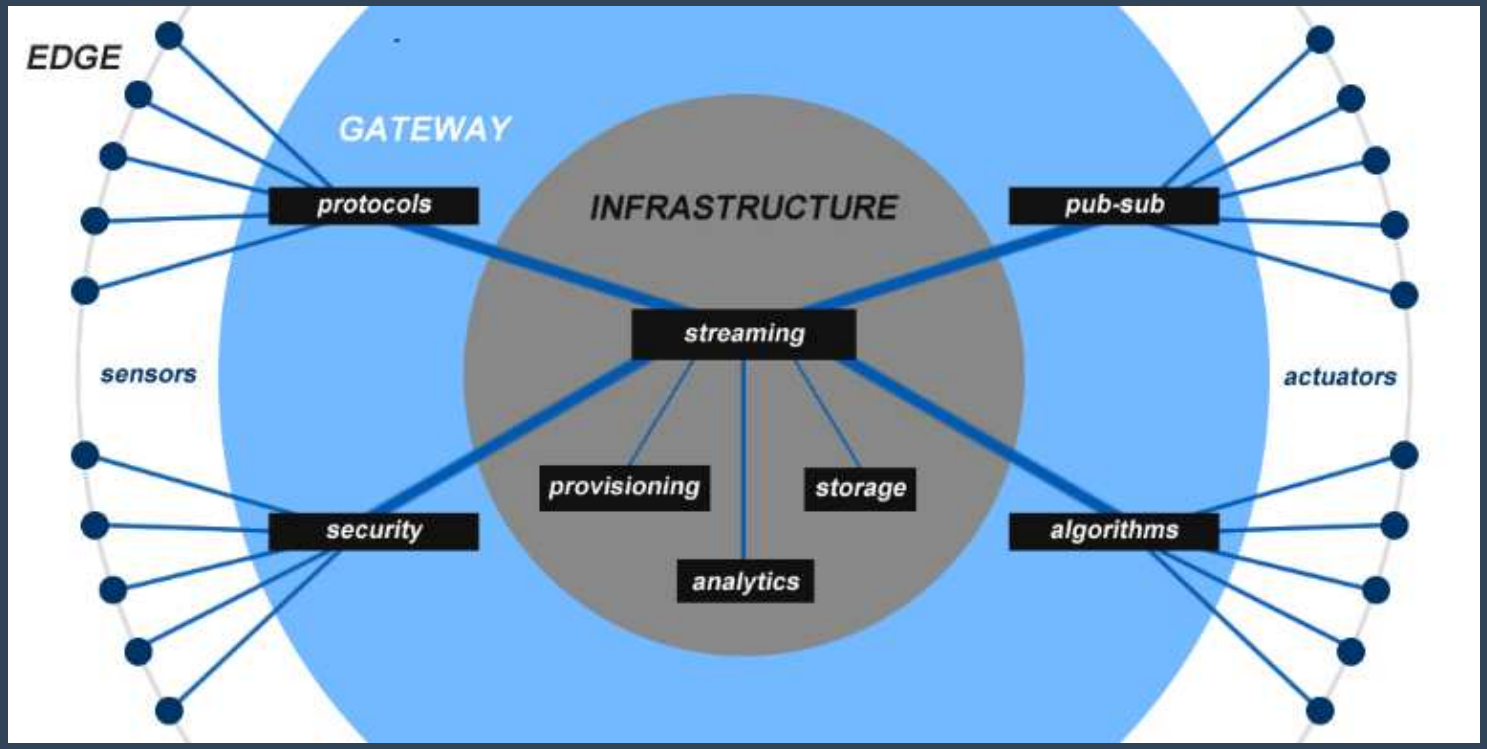
Pre-silicon opportunity

- IP block-level test
- Integration test
- Co-verification
- Optimization

iOS

Good model for mobile …

End-to-end IoT



IoT sort of embedded … but different

- MCUs + wireless
- C programming
- Maker modules
- Long life cycles
- OT

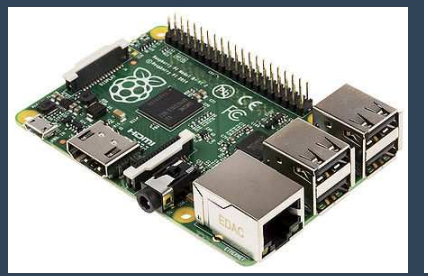
New software … and this is just some of it

Making the IoT?

Merchant chips

+

Open source SW
(mostly)



- Rapid
- Inexpensive
- Edge devices
- Unoptimized
- Trust?

Headed into the frontier

Chips optimized for specific IoT roles

- Power management?
- Network-on-chip?
- Memory controller?
- Process nodes?
- SW or HW acceleration?

EDGE

GATEWAY

INFRASTRUCTURE

IP block-level | Integration | Co-verification | Optimization

Exploration begins

- Many more IoT chip starts coming
- Most in small to medium gate counts
- Running variety of software
- Connected more deeply
- Creating new experiences

UnaliWear Kanega

Fall alert | Med adherence | Wandering

Use cases drive IoT design

- If you can validate your use cases on a merchant SoC, great!
- Astute merchant chip firms already moving in this direction
- UX depends on both HW and SW
- Creates wide area of opportunity for custom SoC design

Personas for web design
Use cases for IoT design

TRUST

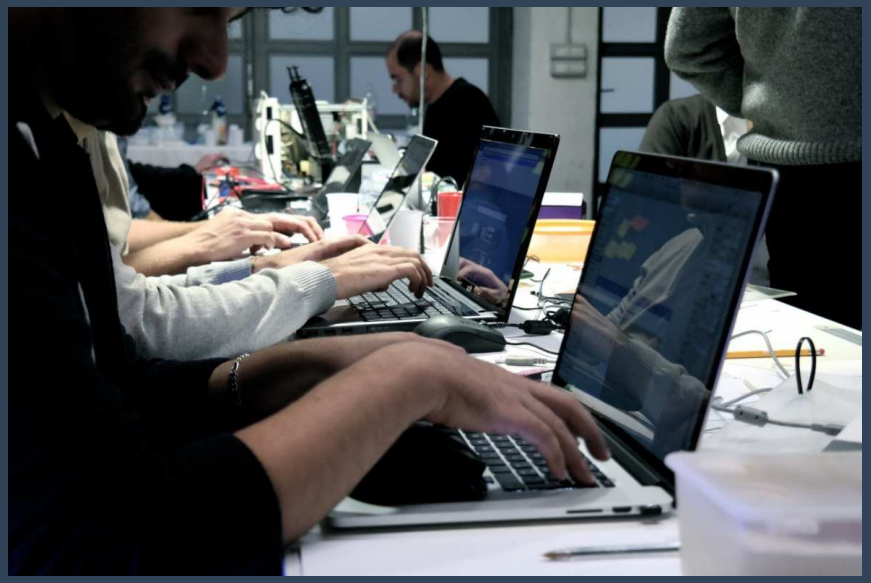
Digging in with FPGAs

- Drive RTL verification with use cases
- Explore everything pre-silicon
- Deeper test and debug
- Build trust from IP block-level through integration to co-verification
- Differentiate through optimization

Aren't we already doing this?

- Weakest link is unexplored IP block
- Your use case may not match mine
- Software can only do so much
- Trust built in years lost in seconds
- First movers may lose if they miss

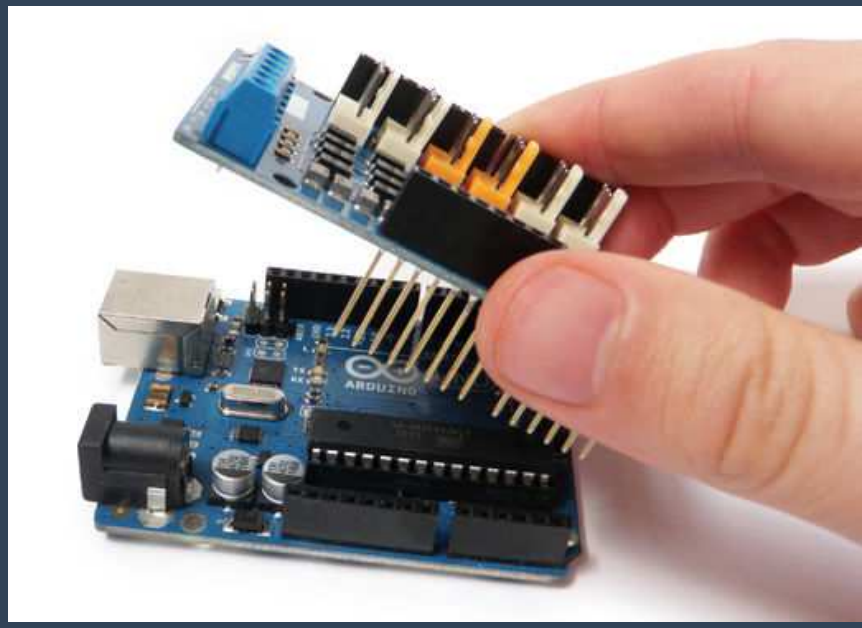
FPGA-based prototyping adapts



- Mobile demanded capacity
- IoT demands flexibility and depth
- Flexibility means any desk
- Depth means speed
- Teams may be anywhere

Tools and techniques need to evolve

- Get out of C programming box
- Mixed-signal capability
- Deep trace IoT protocol debug
- Compliance artifacts
- Remote access
- Cloud IP integration



It's time to sweat the small stuff

- Everything on the IoT is critical
- Dealing with new users
- Reality will be brutal
- Emotions win over logic
- Money will flow toward trust

Questions?

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