

# Semiconductor Design to Test – Closing the Gap to Lab and Production Test

Coseda User Group Meeting 2016

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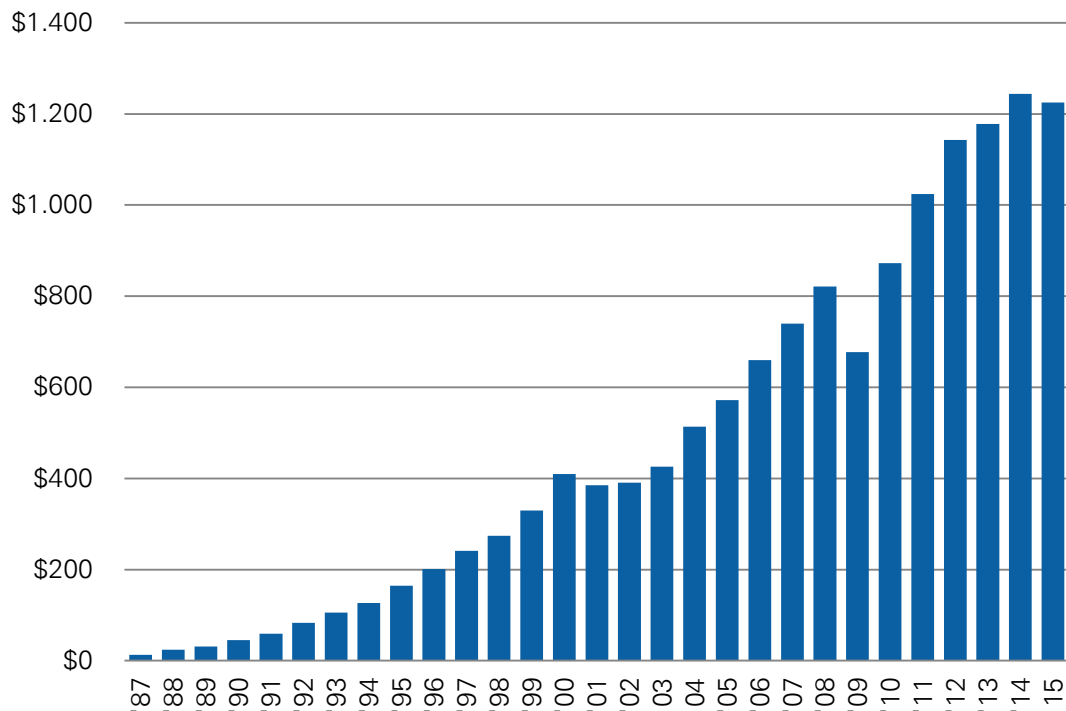
# Long-Term Track Record of Growth

**Revenue:** \$1.23 billion in 2015

**Global Operations:** Approximately 7,400 employees; operations in almost 50 countries

**Broad customer base:** More than 35,000 companies served annually

**Diversity:** No industry >15% of revenue



# A Platform Based-Approach

## CLOSED APPROACH

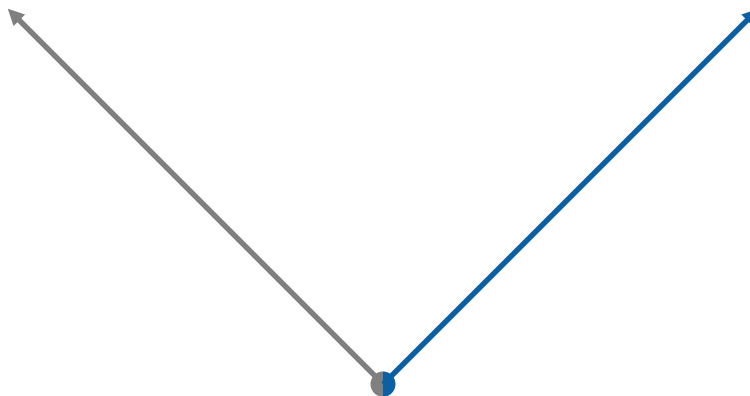
"Vendor knows best"

- Fixed-functionality box instruments
- Extend with **vendor accessible** customization
- Fixed software applications
- Monolithic instrument design
- Resulting closed vendor ecosystem

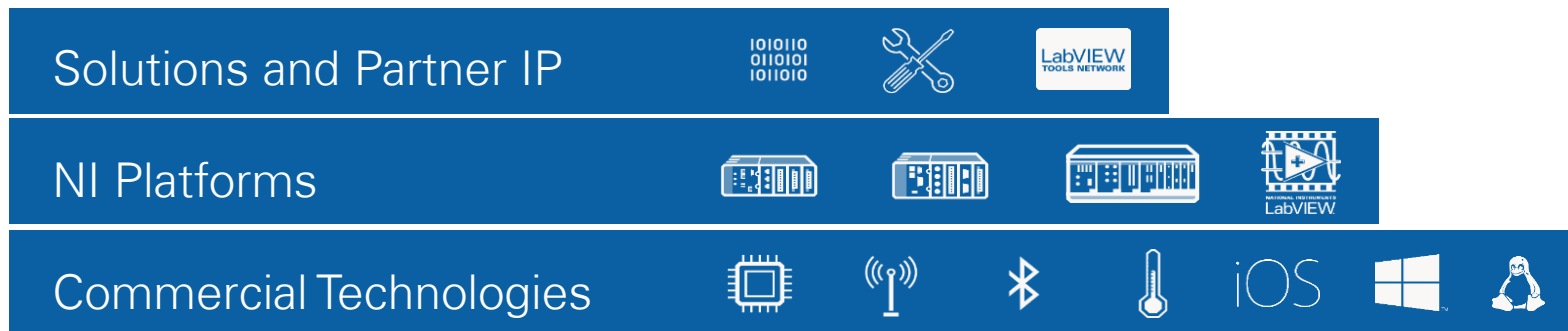
## PLATFORM APPROACH

"Customer knows best"

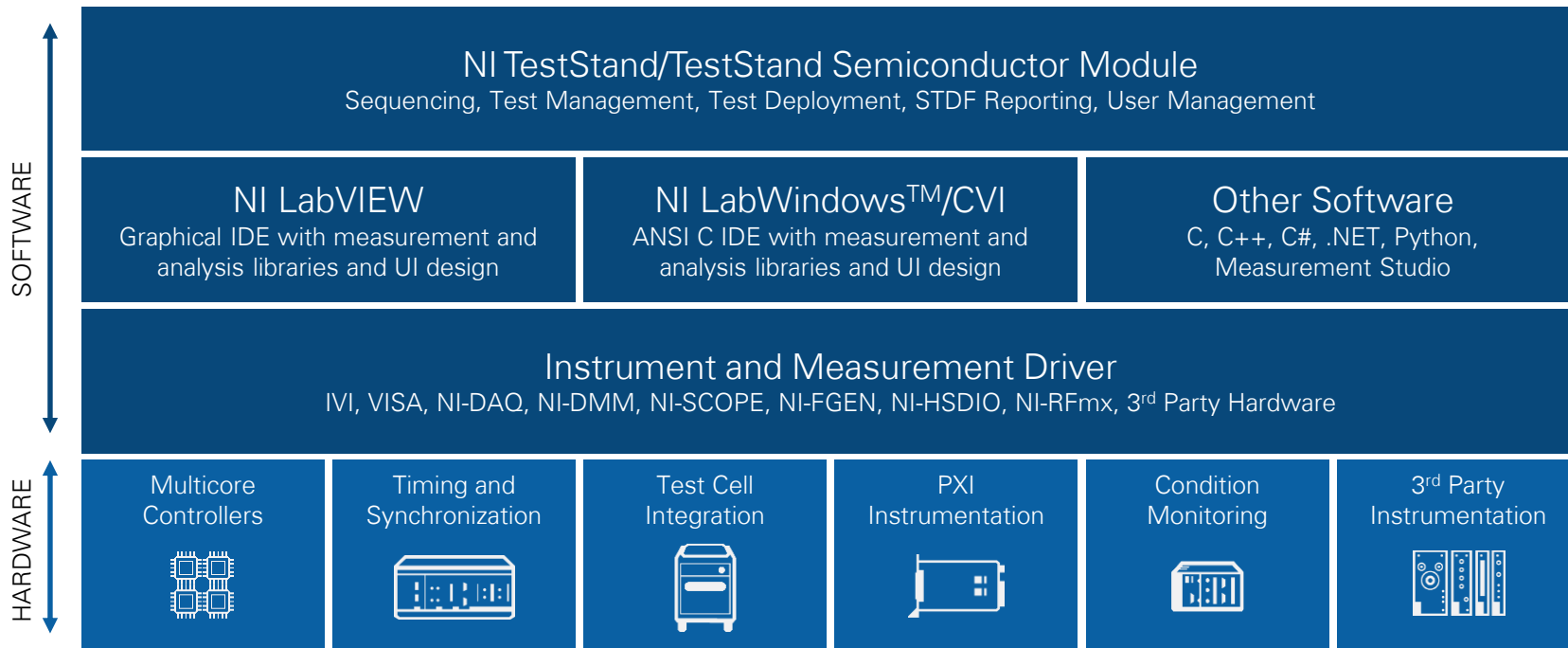
- Out of box measurement ready
- Extend with **user accessible** customization
- Productive, approachable software tools
- Modular instrument design with consistent APIs
- Resulting open partner, user, and IP ecosystem



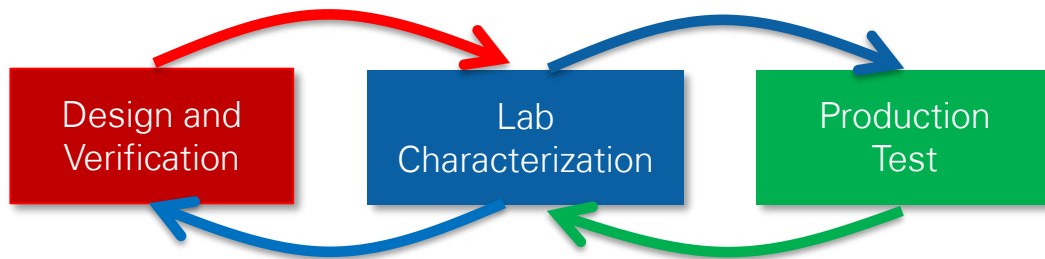
# A Platform-Based Approach



# Architecture of an Automated Test System



# Our Customers Are Telling Us...



- Big gap between design, lab test and production test - Different people, languages, tools, methodologies and databases
- Significant effort to re-create test cases in the lab
- Difficult to reproduce failures in the engineering world and correlate results in simulation, lab test and production test

Design & Prototyping



Lab Characterization



TestStand,  
LabVIEW and PXI

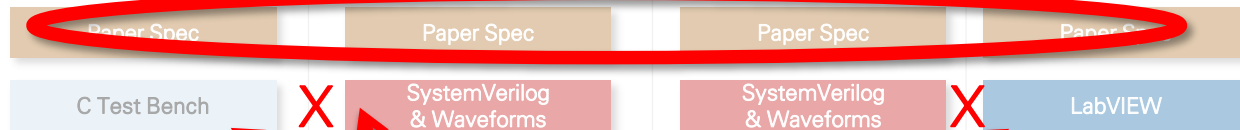
Production Test



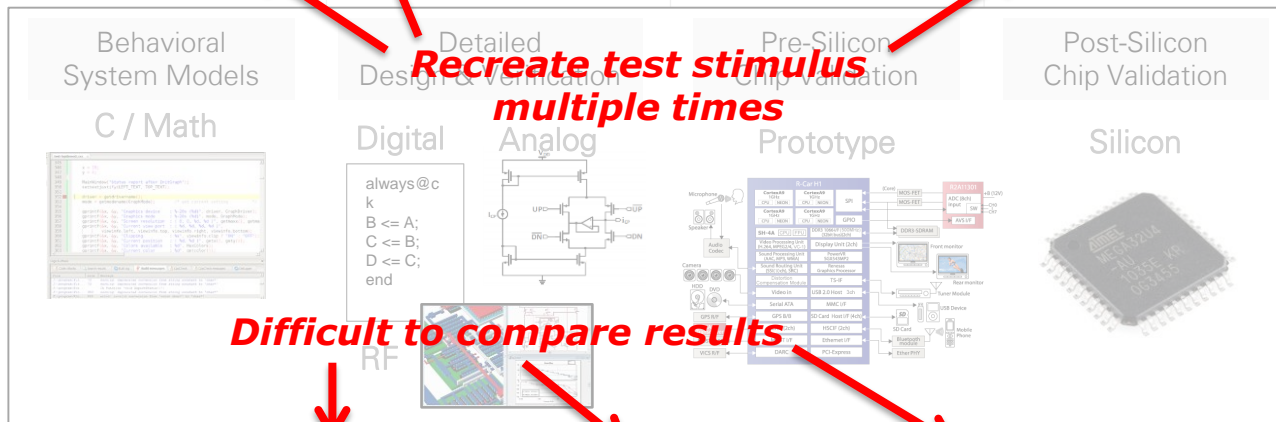
# Design Flow Challenges

**No common executable spec**

Spec  
TestBench



**Recreate test stimulus multiple times**



**Difficult to compare results**

Analysis



Management



**Recreate test sequences**

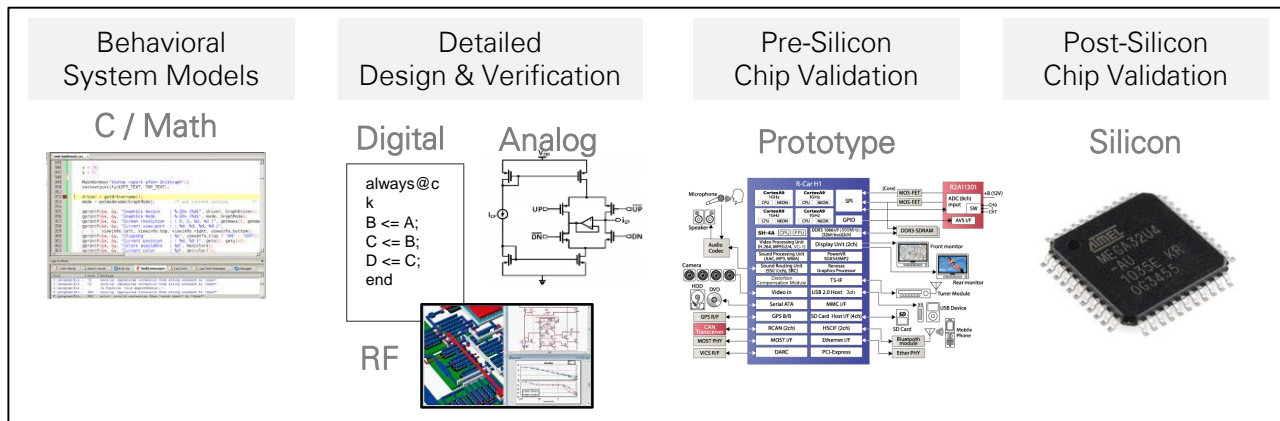
# Design Flow Goal: "IP" Re-Use

Spec

Common Executable Spec for Behavior and Performance

TestBench

Common TestBench Framework



Analysis

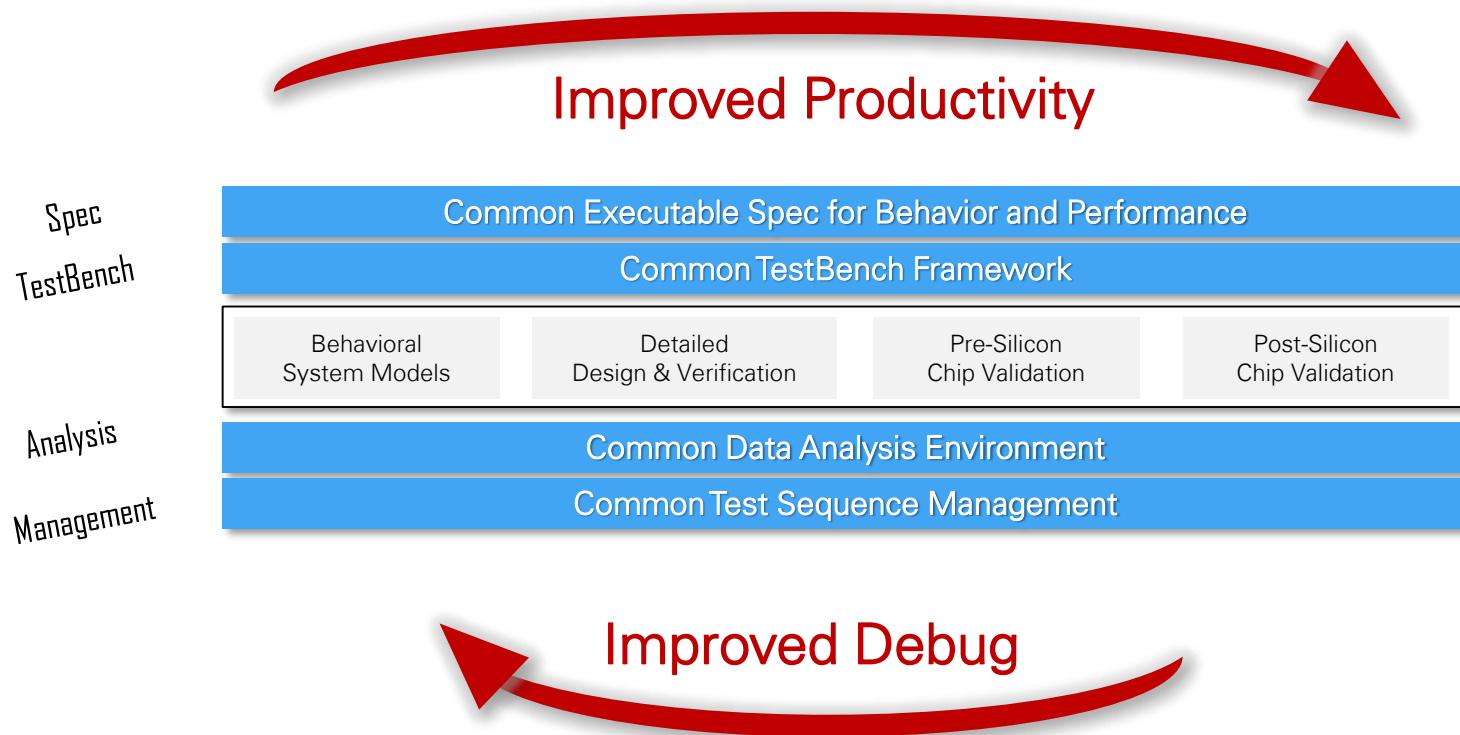
Common Data Analysis Environment

Management

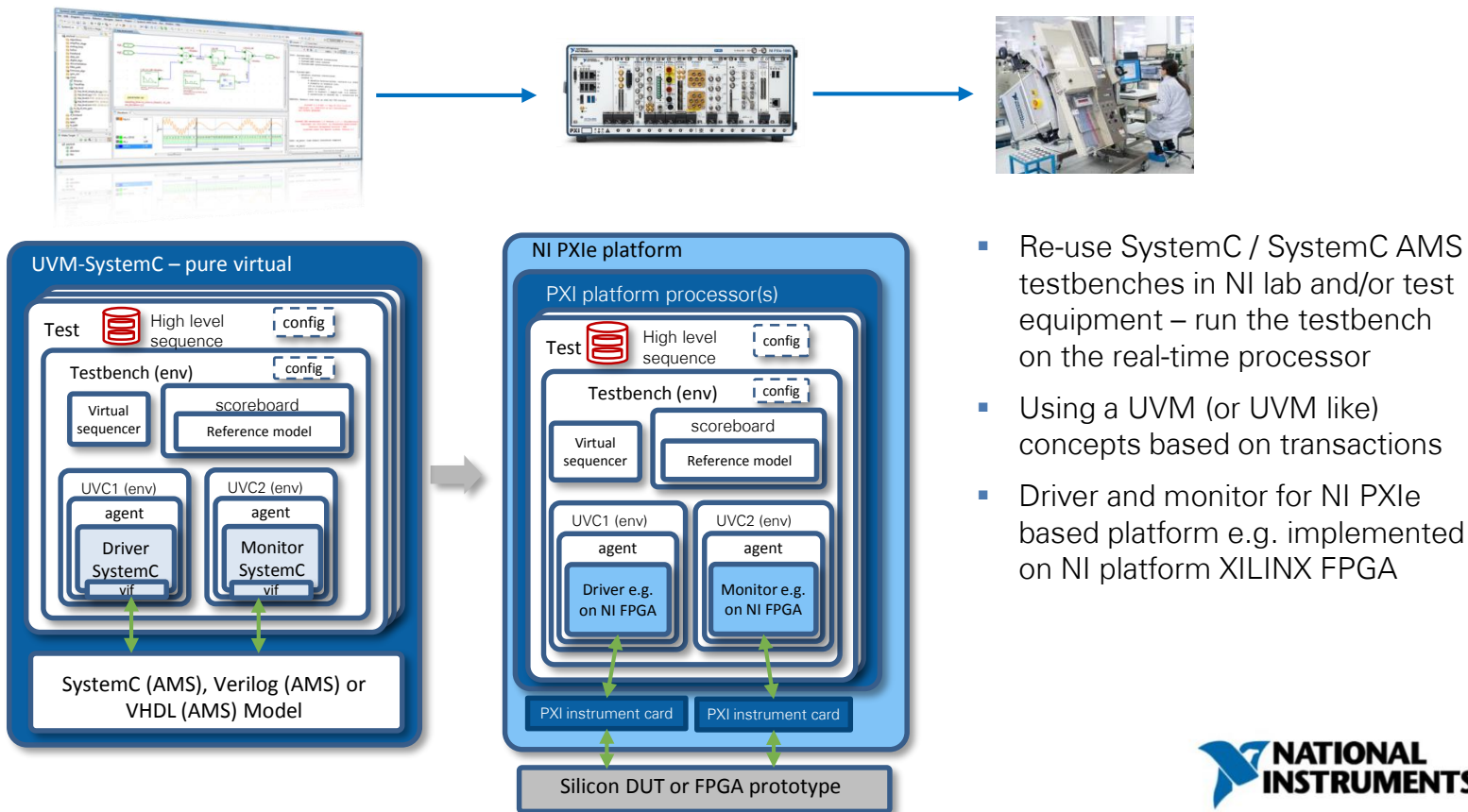
Common Test Sequence Management



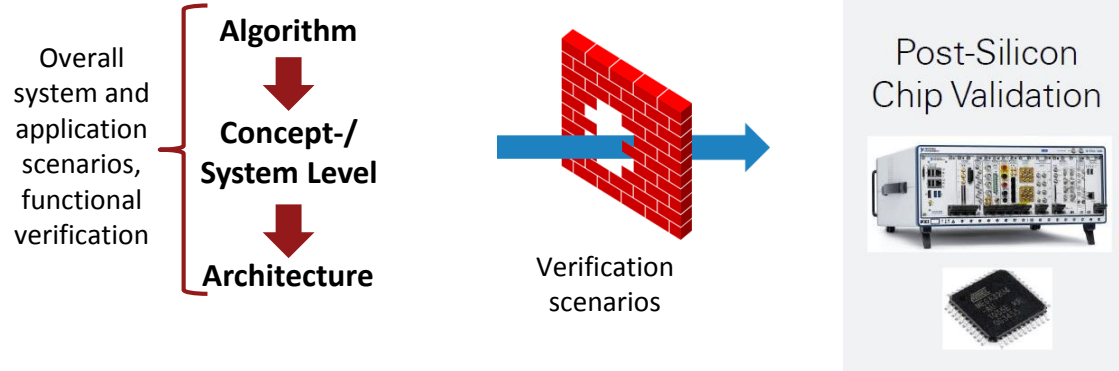
# Two Significant Benefits Between Design & Lab



# D2T with COSEDA – One Concept Idea



# D2T System Level Design to Post-Silicon Validation



# Design to Test - Summary

- D2T establishes seamless path from pre-silicon to post-silicon
- Significant cost saving and development time shortening
- Improved quality, predictability and traceability from pre- to post-silicon
- Focus on data analysis across the flow and portable stimulus
- Re-use of tests from System/Concept design improves post-silicon validation
- Re-use of stimuli from implementation level design improves production test development

