I created the Verification Gap

Ram Narayan & Tom Symons
Oracle Labs
Verification Gap Impact

Project Schedule
- Miss: 39%
- Meet: 61%

First Silicon
- Failure: 33%
- Success: 67%

CAGR
- Verifiers: 12.5%
- Designers: 3.7%

Modus Operandi

• Surveyed industry participants
  – Is the Verification Gap growing?
  – What causes the Verification Gap?
  – What have you done to cause or reduce the Verification Gap?

• Classify the Verification Gap
  – By contributors
  – By tractability
Verification Gap Tractability

Inherent Verification Gap

Transient Verification Gap

Self-induced Verification Gap

That hurt. Maybe this one won’t be so bad!
Verification Gap Contributors

- The Complexity Gap
- The Skills Gap
- The Schedule Gap
- The Quality Gap
- The Metrics Gap
- The Reuse Gap
- The Integrity Gap
Complexity Gap

• Complexity sources
  – IP’s + Features
  – Cores
  – Configurations
  – Protocol complexity
  – SW content

• Verification impact inherent
Skills Gap

- Growing verification skill set
- Design as well as verification
- Lack of software skills
- Productivity range up to 10x
- Skills development
- Innovation management
- Management skills
- Both transient and self-induced
Schedule Gap

• Are schedules the problem?
  – Aggressive schedules
  – Aggressive milestones

• Pressure forces shortcuts

• Pay me now or pay me later

• Both transient and self-induced
Quality Gap

• Architectural Thrash

• Environment Quality
  – Build methods
  – Edit-compile-run loop
  – Regression Management

• Best-known-methods not in use
  – Often seen as low priority
  – ~20% productivity hit
Metrics Gap

• Metrics explosion
  – Coverage driven verification
  – Assertion driven verification

• Metrics for metrics sake
  – What matters?
  – What does not?

• Scheduling coverage closure
Reuse Gap

• Design IP usage growing
  – Easy for design to insert
  – Hard for verification and software

• IP domain knowledge gap

• IP knowledge developed at one level not leveraged well at next level
Integrity Gap

Fear Driven Verification

Miscommunication Driven Verification

Lack of Introspection

Ulterior Motives Driven Verification
Verification Gap Summary
That hurt. Maybe this one won’t be so bad!
Conclusion

• Perception of Verification Gap

• Verification is NOT for the paranoid

• Choice & Responsibility
Next Step

• Understand YOUR Verification Gap

• Address the Self-Induced Gap……..NOW!
  – Am I creating the Verification Gap?
  – What problem am I trying to solve?