

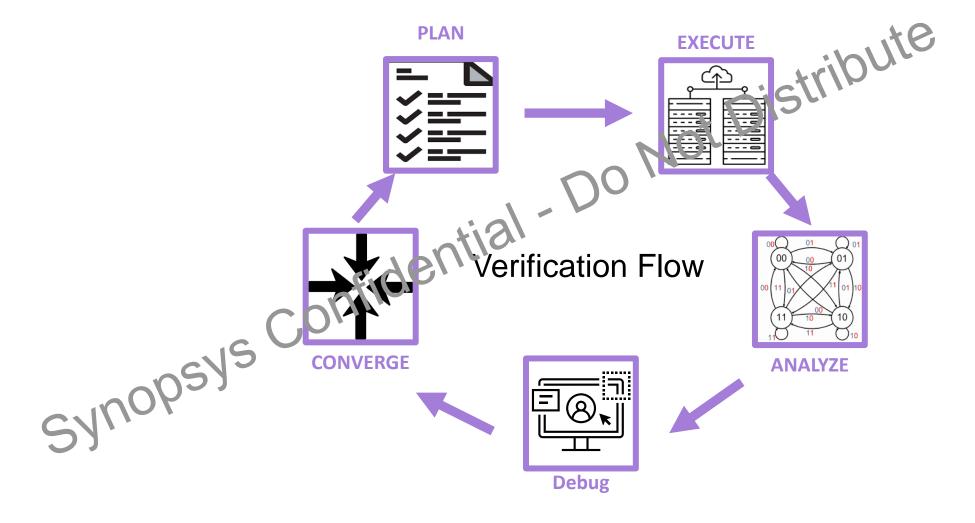
# Integrated Verification Ecosystem for Regression Management, Coverage convergence, and Debug Automation

Ching-Yi Huang, William Huang, Craig Yang Synopsys





## **Next-Generation Verdi**







**PLAN** 

#### **Next-Generation Verdi**

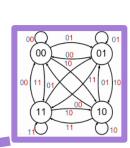
#### **EXECUTE**



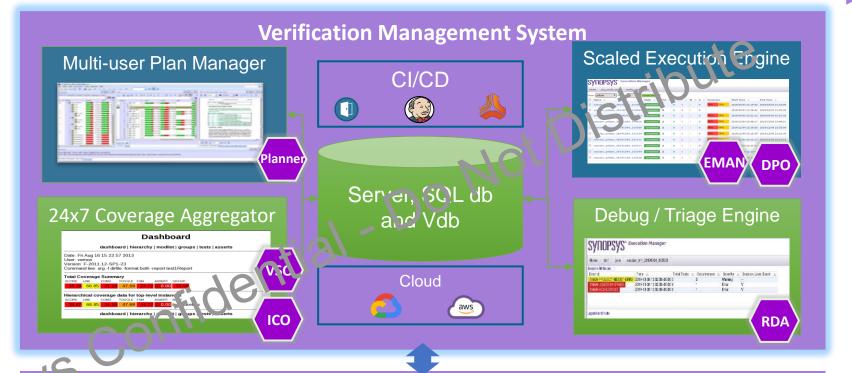








**ANALYZE** 





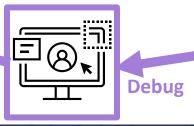
∨C SpyGlass **VC Formal** 

VCS

FineSim

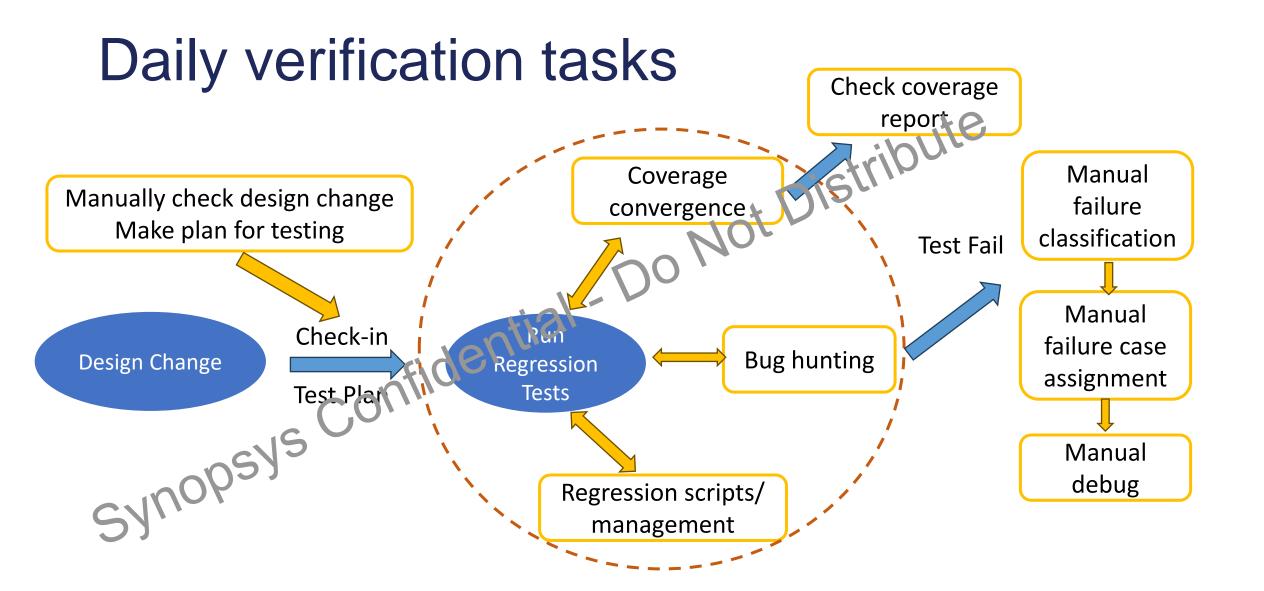
ZeBu

3<sup>rd</sup> Party Tools



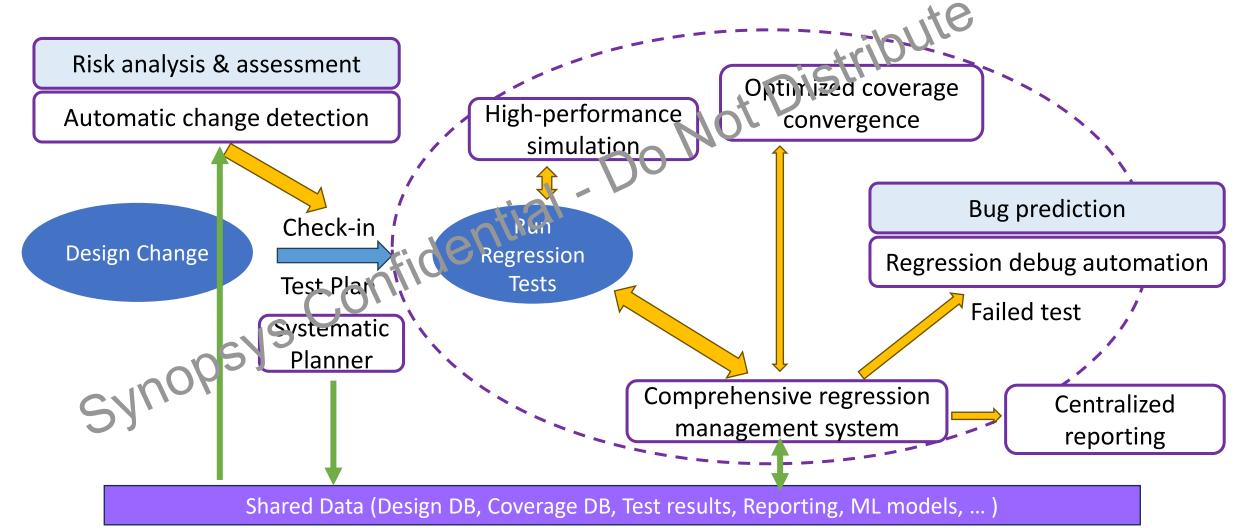








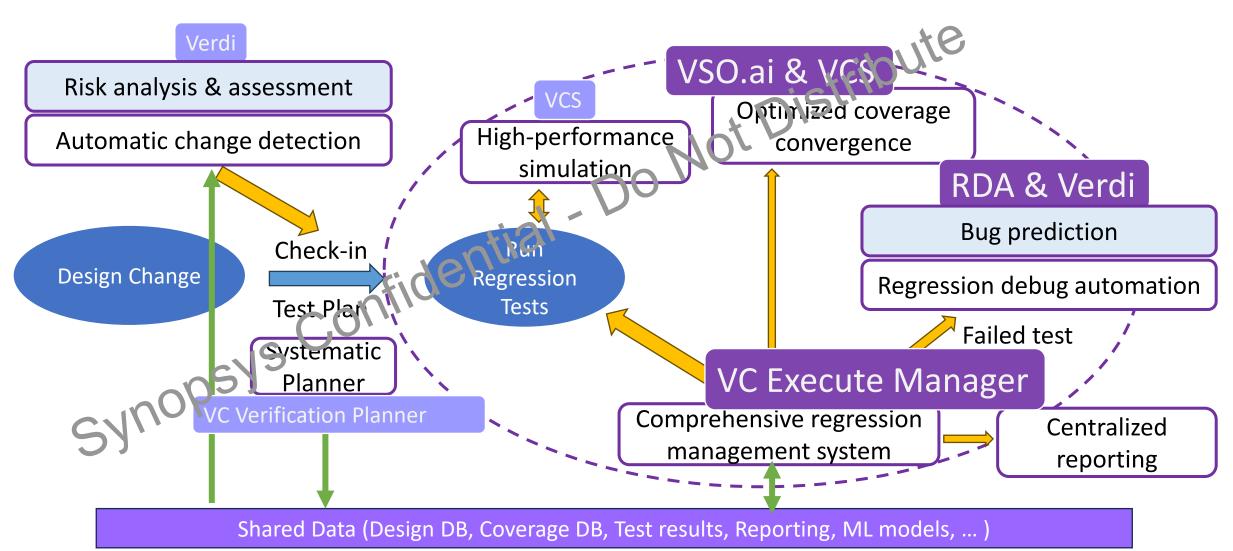
## Automatic verification flow







## Automatic verification flow





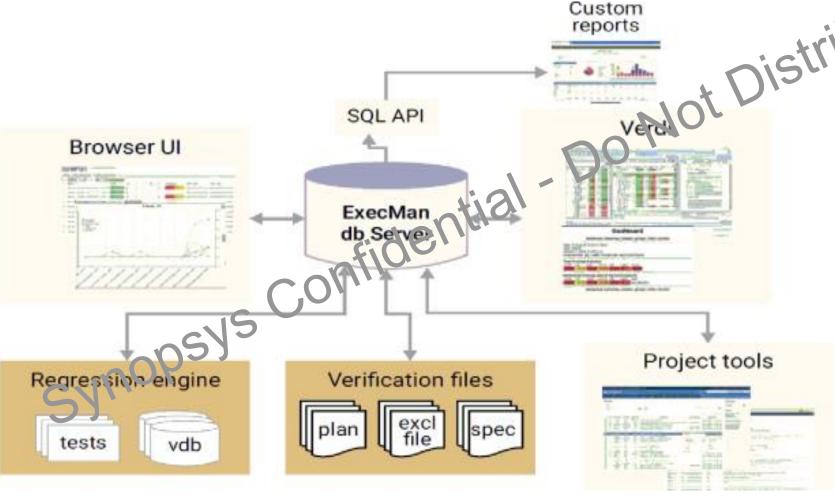
## Outline

- Introduction of VC Execution Manager (VC EMAN)
  Introduction of VSO.ai
  Introduction of RDA

- Benefits of integration
- Complementing technologies in the verification ecosystem
  Conclusion



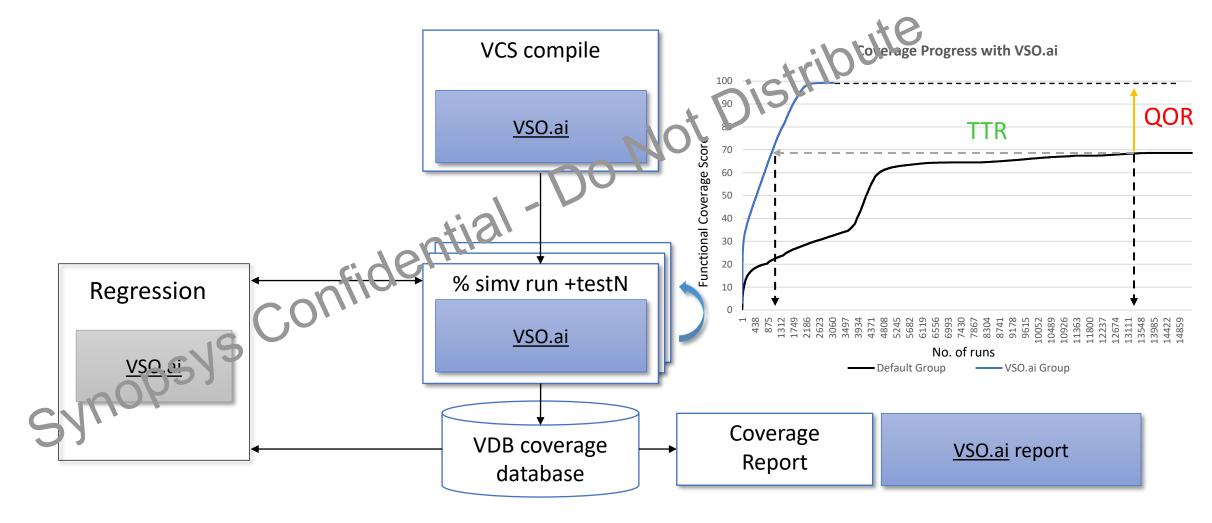
# VC Execution Manager



- Data organized by session
- Track across life of project
   Test results & performance
  - Verification Plan scores
- Analysis & debug in Verdi
- Tracking in Browser UI
- Open API to all stored data for customized project tracking
- Enhance the teams to coordinate
- Support both database server and serverless capability
- Support execution on local host and grid managers
- Support automatic coverage merging and debug rerun



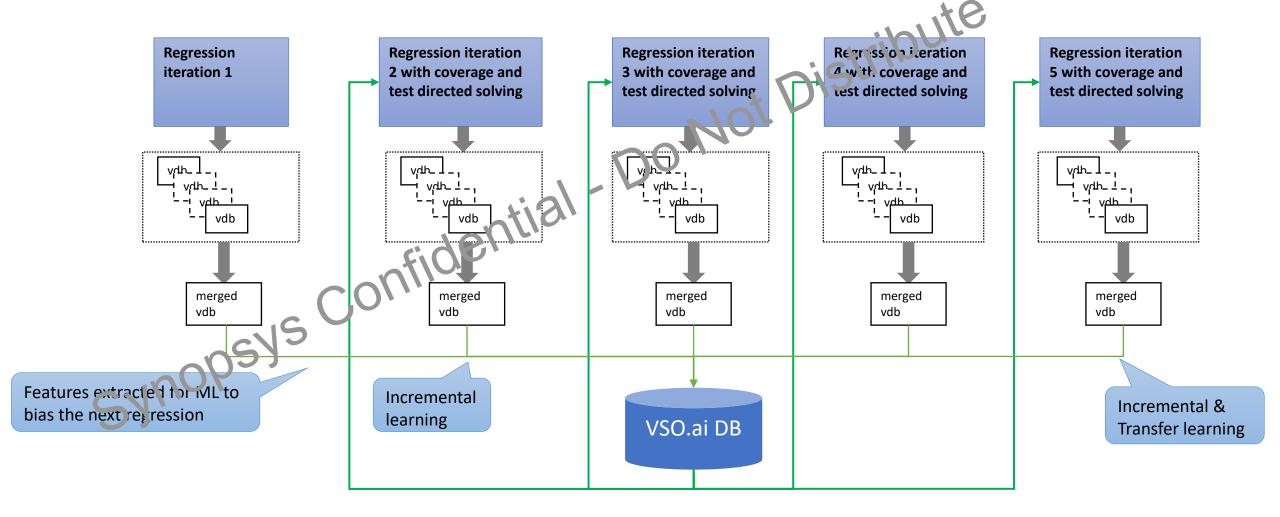
# Optimized Regression with VSO.ai







## Use Model for VSO.ai







#### Regression Debug Automation Debug and Regression Execution Failure Triage and Analysis with RCA Jot Distribute Codes check-in Regression Probe sim Regression Run Manager Re-run **Regression Debug Automation** Reference Passing tests snanshot\* **Debug GUI Debug Engines RCA Manager DUT RCA XRCA** ML In-Sync Debug Probe Clusters **Binning Facilitator** Debug Log/Msg **TBRCA RCA Report** Analysis / • Bucketize reg failures. • If ref. snapshot found, • Debug GUI to • Probe code changes



User consumable results

• Representative case picked

 Probe code changes checked-in that cause failures  If ref. snapshot found, debug engines to root cause the bugs

- Debug GUI to complement the debug engines.
- RCA Manager and Report for engineer to review







## **EMAN-VSO**

#### w/o integration

User learns VSO.ai Modify scrips/makefile for running on user regression system

fidentia

See results (depends on how you Onanage data)

VSO.ai DB



Hand shaking

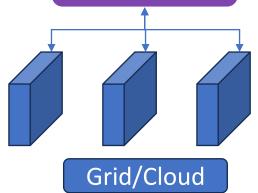
EMAN client

w/ integration

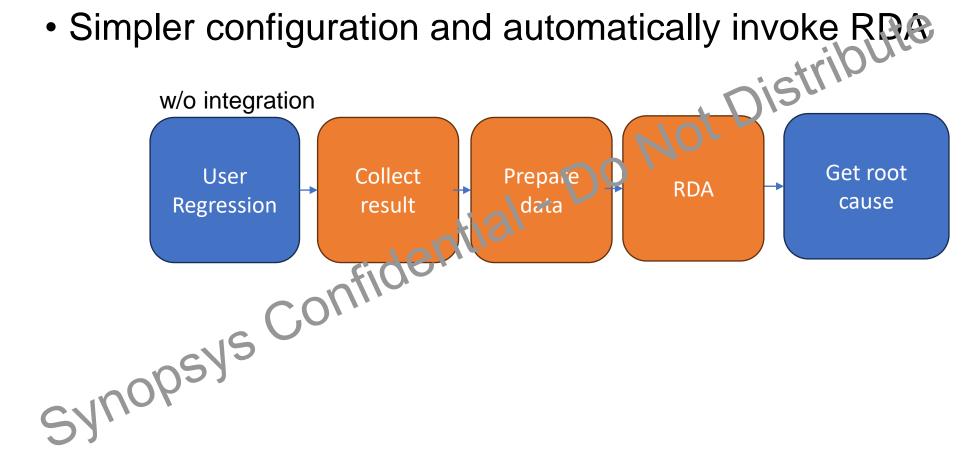
Setup in VC EMAN

Kunning VSO together w/ VC EMAN & maximized grid computation

View coverage report in EMAN/Verdi

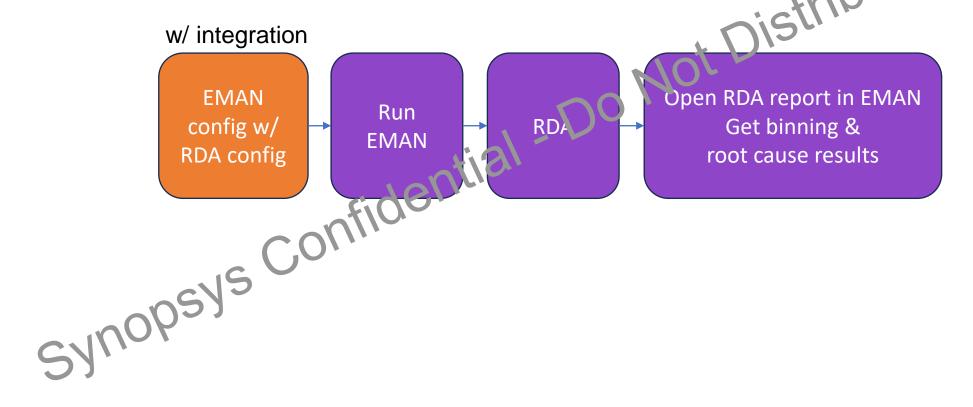


#### **EMAN-RDA**



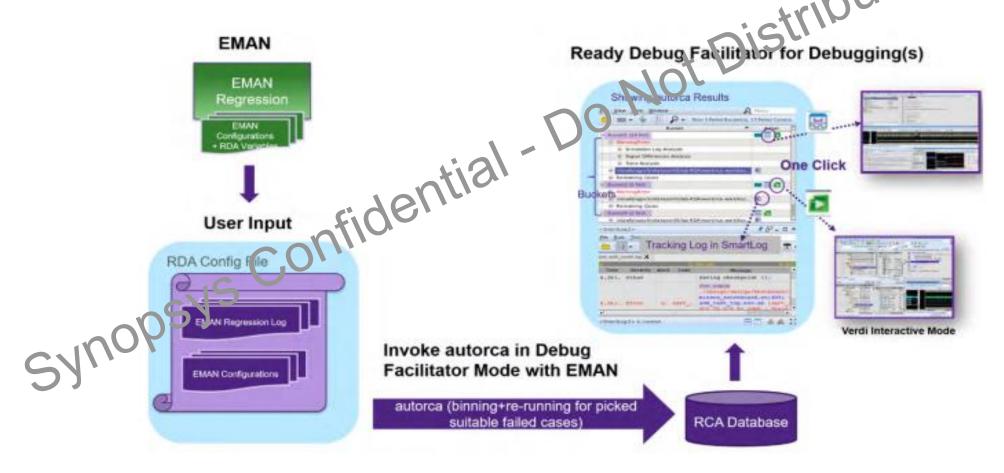
#### **EMAN-RDA**

• Simpler configuration and automatically invoke RDA



#### **EMAN-RDA**

Simpler configuration and automatically invoke RDA



# Regression Debug Automation w/ EMAN

SYSTEMS INITIATIVE

To Not Distribute Unified Configuration, Usage Flow for Different Usage Scenarios **Regression Failure Cases Binning** Probe Simulation Log File ML-based Probe with **EMAN** regression Synopsys **Debug Points Debug GUI RCA** Regression Log analysis RCA **DUT RCA** manager Identify vif **Unified RCA TBRCA** diff report TFV User manual **CCD** (DUT RCA) input scopes Reference Target KDB TransView Reference **FSDB** (TB RCA) KDB Log Debug Debug Target Reference (MA included) **Facilitator** simv simv Differential Debug 2024 DVCDN

#### What's more RDA/RCA VSO.ai DB report **EMAN** VSO.ai **RDA** changes tahures coverage Verification automation ecosystem **Shared Data** Quick assignment Alarm for code review to designer Code Failed change Auto Change detection Quicker RDA Bug case **Auto Run EMAN** & Risk analysis & Better RCA ranking prediction RDA/RCA for Random seed tests



# Complementing technologies

#### VCS DPO:

 Dynamic Performance Optimizer (DPO) is an intelligent automated approach that enables necessary diagnostics during VCS compile and simulation and leverages AI to recommend the appropriate set of options for enabling maximum performance without manual intervention

#### • VCS ICO:

 Add-on for VCS fits seamlessly in your regression environment and enables you to improve verification productivity (hitting more and efficiency by generating better stimulus using Reinforcement Learning

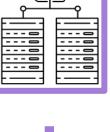


#### Conclusion

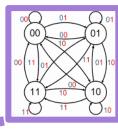
#### **EXECUTE**



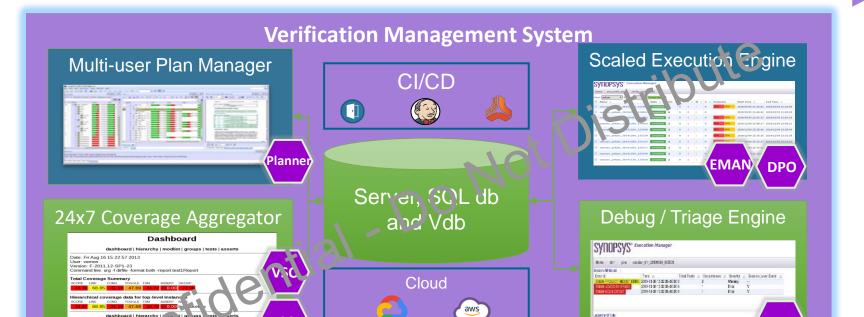














VC SpyGlass

**VC Formal** 

ICO

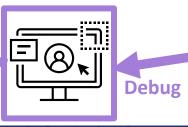
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**RDA** 







## Questions

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