



Unleashing the Potential of Agentic AI Within Design & Functional Verification

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SIEMENS

accellera
SYSTEMS INITIATIVE

Presenters



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Agenda

Introduction

- Introduction to Questa™ One and EDAi Platform
- How Siemens is Unlocking the Potential of AI
- Introducing Smart Verification

Demos

- Smart Creation powered by GenAI
- Smart Regression & Smart Debug powered by Predictive AI
- Smart Analysis accelerated by Analytical AI
- Smart Engines optimized by Predictive AI

The Future

- A look at The Future of AI Driven Functional Verification

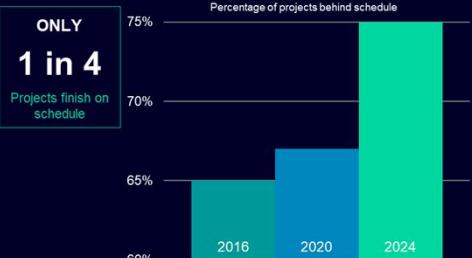
The Design Productivity Gap is a Growing Problem

Complexity and Resourcing become more of a Challenge

Wilson Research Group Study, 2024 Functional Verification Study

Schedule overruns

Projects finishing late



Despite declines in first-silicon success, teams are investing more in design and verification

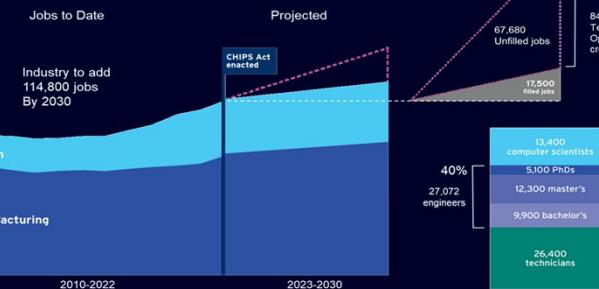
Skilled Workers

Unfilled Semiconductor Jobs

ONLY
1 in 4
Job Openings will be Filled by 2030

Insufficient Graduation of Skilled Workers & Experienced Workers Retiring

Semiconductor Industry Association (SIA), July 2023

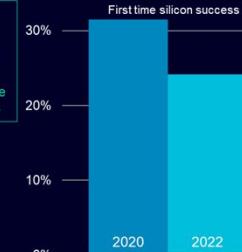


Wilson Research Group Study, 2024 Functional Verification Study

First silicon success

Number of spins before production

ONLY
1 in 7
Achieve first time silicon success

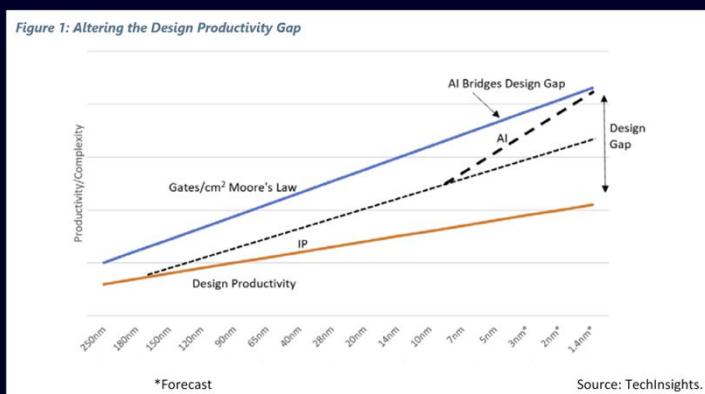


Decline in first silicon success combined with increasing wafer and mask cost

Not enough time!

Not enough Engineers!

Not enough first-time-right!



Advanced EDA tools, new methodologies such as “shift left”, and IP blocks (internal or 3rd party) have made it possible to close the gap somewhat ... **IT'S NOT ENOUGH**



AI won't take your job, but
someone using AI will



... **BUT**
oversimplifies the
TRUE impact of AI

Innovation Continually Reshapes Jobs

Transformative Change is the Constant in Story of Progress



15C

Print

- ↓ Scribe: book dist
- ↑ Printer



17C

Agricultural



19C

Rail Revolution



21C

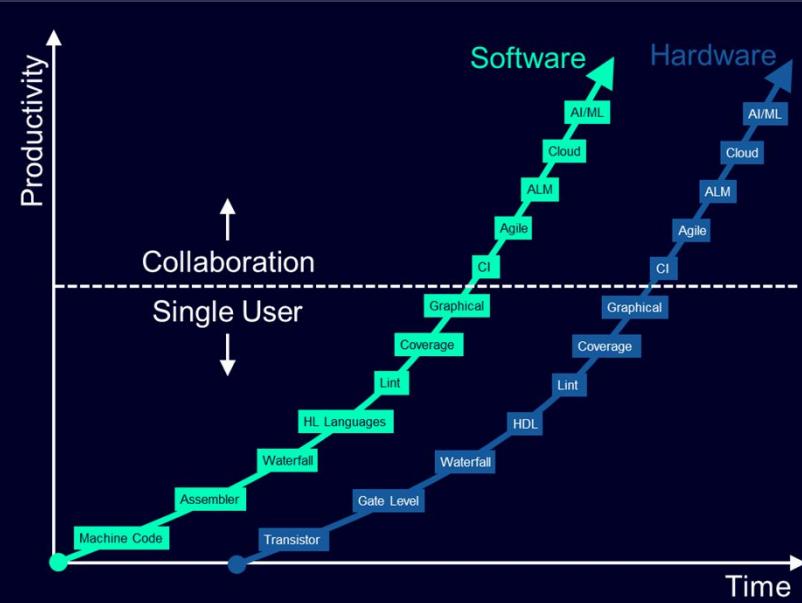
Internet Revolution

- ↓ Travel agents, print journalists, video rental, traditional retail staff
- ↑ Web developers, digital marketers, e-com managers, social media managers, app developers

SW Dev AI Revolution

↓ Software testers, Entry level coders, Bug triagers, basic technical support, documentation writers, Build/release engineers, Legacy code maintainers

- ↑ Prompt engineers, AI/ML engineers and data scientists, AI integration specialists, AI ethics and compliance managers, Model trainers and validators, Synthetic data creators, Human-in-the-loop quality assessors, AIOps engineers



Gunpowder Revolution

- ↓ Archers, bow craftsmen, armoured knights
- ↑ Musketeers, gunsmiths, artillery officers, firearm tacticians, common soldiers



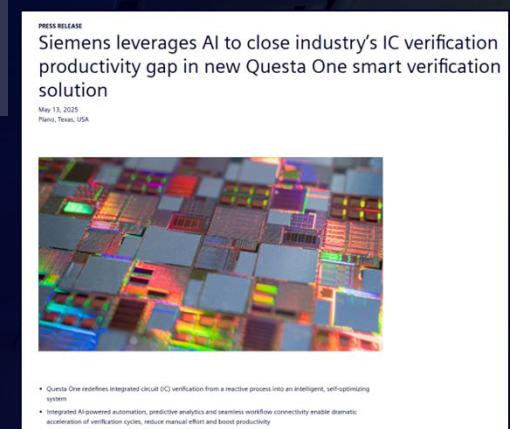
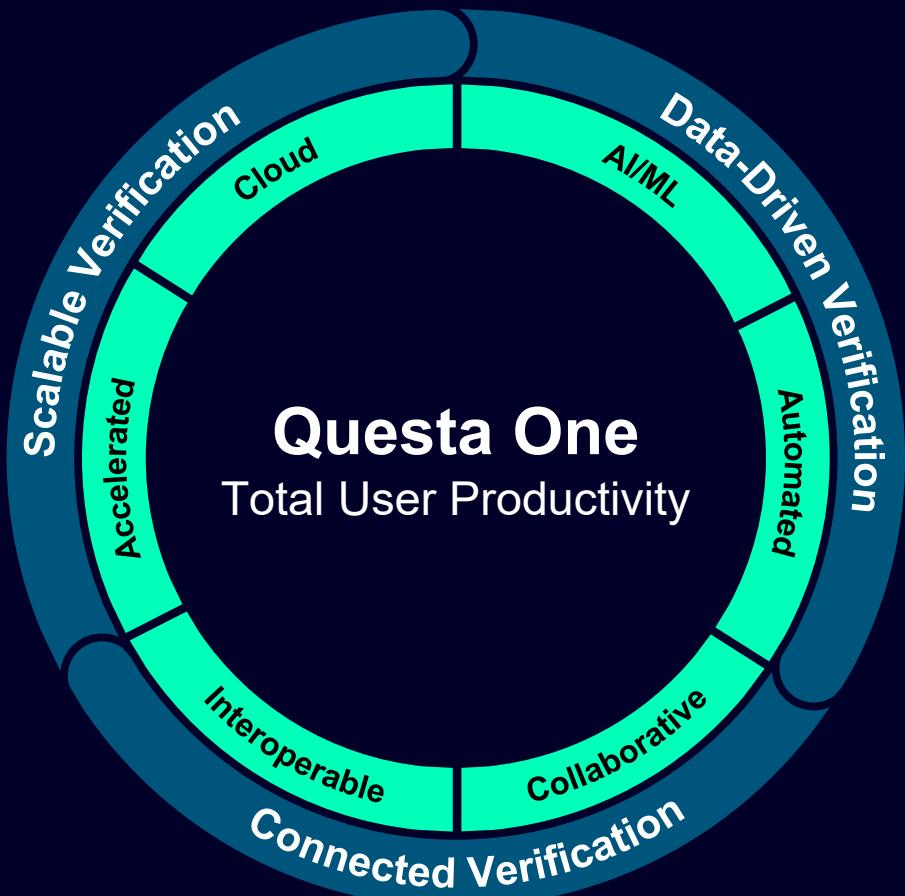
Digital Revolution

- ↓ Typists, switchboard operators, manual accountants, assembly line workers
- ↑ Programmers, IT specialists, systems analysts, automation engineers

Questa™ One Smart Verification Solution enabled by AI

Preparing for Transformation and Accelerating User Productivity

Launched
May 2025



Faster
Engines
▼

✓ Delivering up to **5x** improved
Total User Productivity

Faster
Engineers
▼

✓ **Scalable, connected, data-driven**
infrastructure for transformation to
Agent based verification

Fewer
Workloads
▼

SIEMENS

Launched
May 2025

Questa™ One Smart Verification Solution enabled by AI

Supports Connected, Scalable and Data-driven Agentic Foundations

Questa One Sim

One engine with breakthrough performance for functional & fault sim for RTL, GLS, & DFT applications with parallel processing & profiling

Questa One SFV

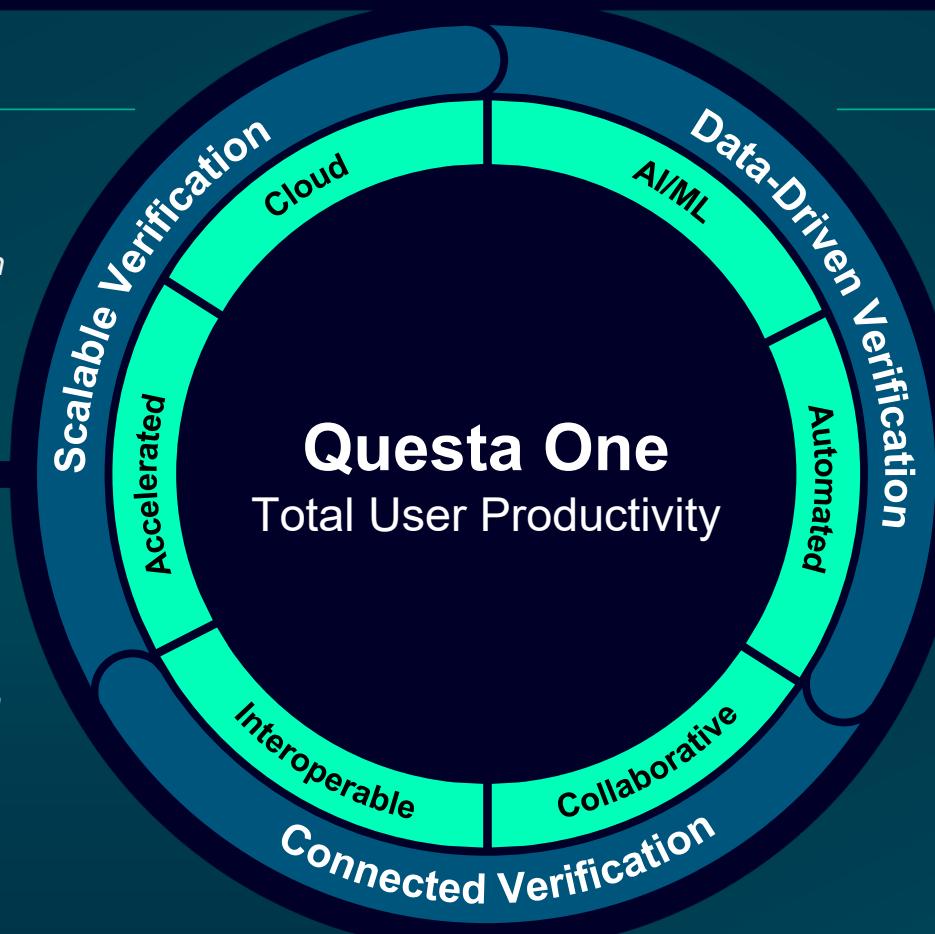
One stimulus free verification solution delivers total user productivity through synergistic combinations of static & formal analyses, AI, automation & parallelization

Questa One Verification IQ

One smart common management solution that utilizes generative, analytic, & predictive AI to drive to verification closure faster, with fewer workloads

Questa One Avery VIP

One industry-leading VIP solution that supports 3DIC & chiplet verification from IP to SoC, seamlessly integrating simulation & emulation



Launched at DAC
23rd June



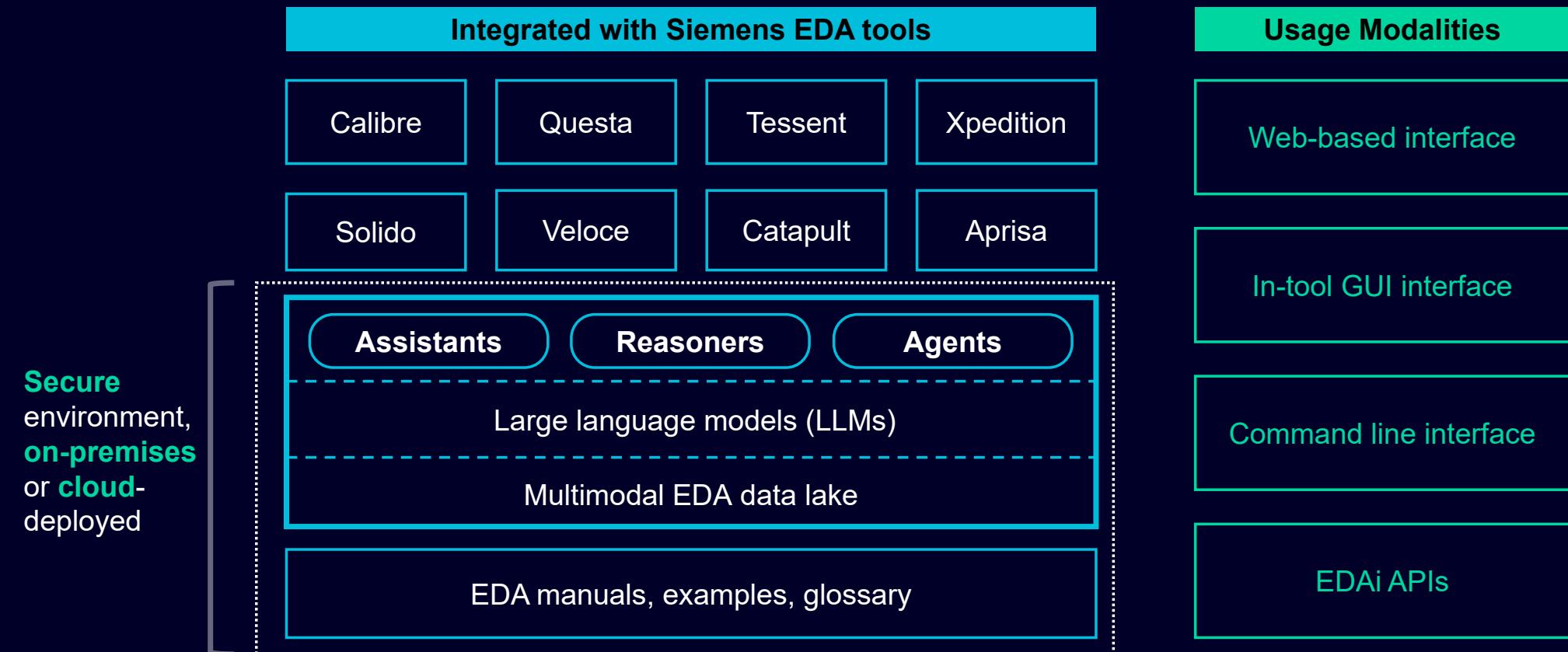
Siemens EDA AI Platform

Built to take the journey to Artificial General Intelligence (AGI)

Launched
June 2025

AI platform by Siemens EDAi

Open, modular, and integrated with all Siemens EDA tools



A Platform Developed with the Future in Mind

Each level of AI becomes increasingly capable and complex

Level 1

Chatbots

Human-like conversations capabilities

ChatGPT 3.5

Claude 2

2023

Level 2

Reasoners

Context-aware problem solving

ChatGPT o1 / o3,

Deepseek R1/V3

Claude 3.5

2024/5

Level 3

Agents

Takes autonomous actions

OpenAI “Operator”

2025

Level 4

Innovators

Produce new solutions / science / systems

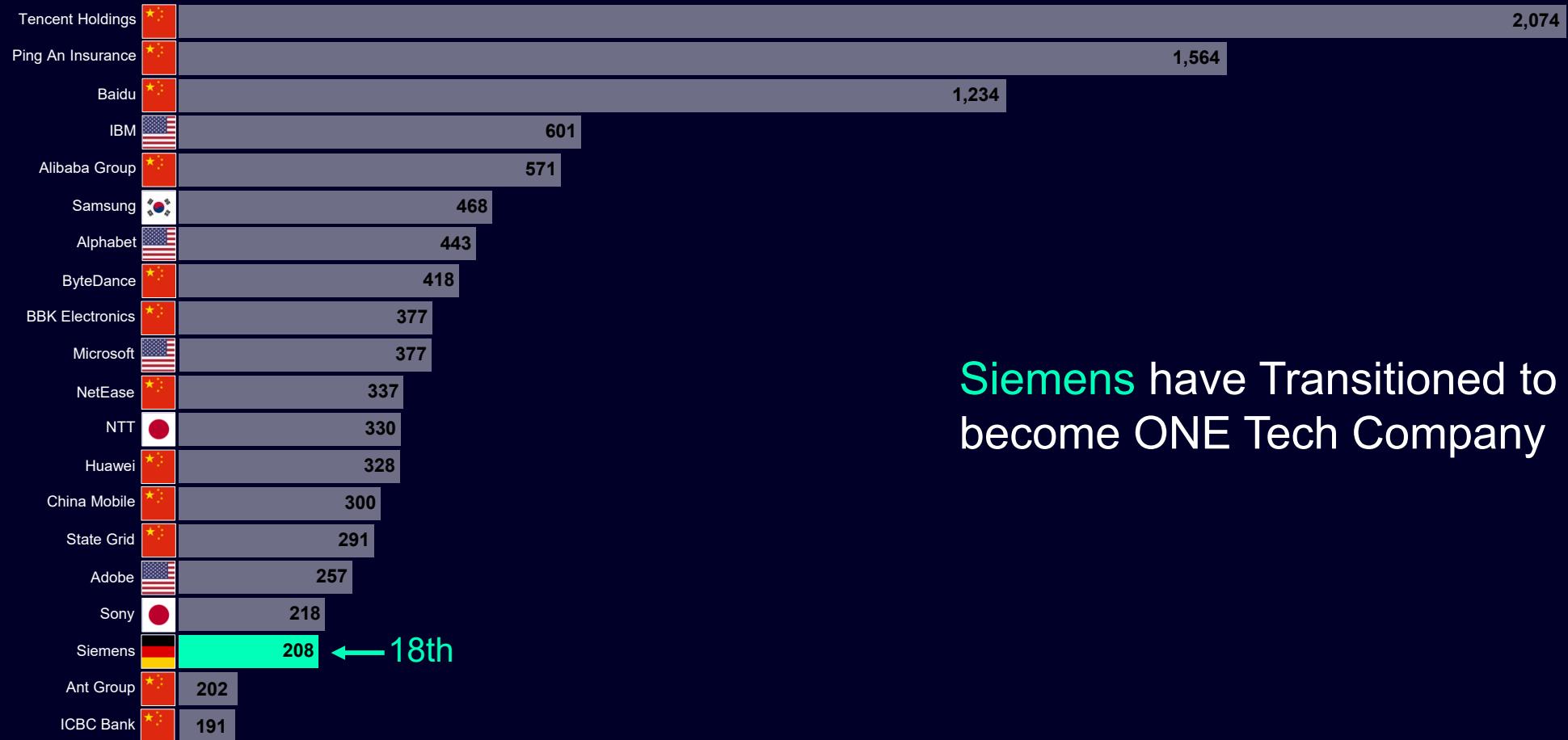
Level 5

Organizers

Manages large-scale operations

Worldwide Generative AI Patents

Reimagining Siemens Beyond Traditional Boundaries



Siemens have Transitioned to become ONE Tech Company



April 2024

An Open Platform Developed for Interoperability

Two operating models for enabled GenAI capabilities

Launched at
 DAC 2025 (June)

Platform powers GenAI in all Siemens EDA tools

Integrated with Siemens EDA tools

Calibre

Questa

Tessent

Xpedition

Solido

Veloce

Catapult

Aprisa

Assistants

Reasoners

Agents

Large language models (LLMs)

Multimodal EDA data lake

EDA manuals, examples, glossary

Customers can build on standalone platform

Integrated with Customers Environment

Scripts

3rd Party Apps

EDA Apps

In-house Tools

Integrations

Workflows

Assistants

Reasoners

Agents

Large language models (LLMs)

Multimodal EDA data lake

Design Specs, design libraries, JIRAs, Confluence, App notes, cross vendor data

Launched at DAC
23rd June



Unlocking the Potential of AI

Applying Artificial Intelligence to Functional Verification

Focusing the Potential of AI for Verification Productivity

The Different AI Approaches and Product/Feature Targets

Analyze

Identification of key data insights not practical with traditional methods



Analytical AI

Ai
Solutions

Predictive AI

Generate

Accelerate design creation, system optimization, and model abstraction



Generative AI

Optimize

Domain specific predictive models to reduce computational requirements and accelerate decision making



FASTER ENGINES

Complimenting heuristics and graph analytics in core engines & tools



FASTER ENGINEERS

Enabling new creation, analysis, assistant and debug capabilities

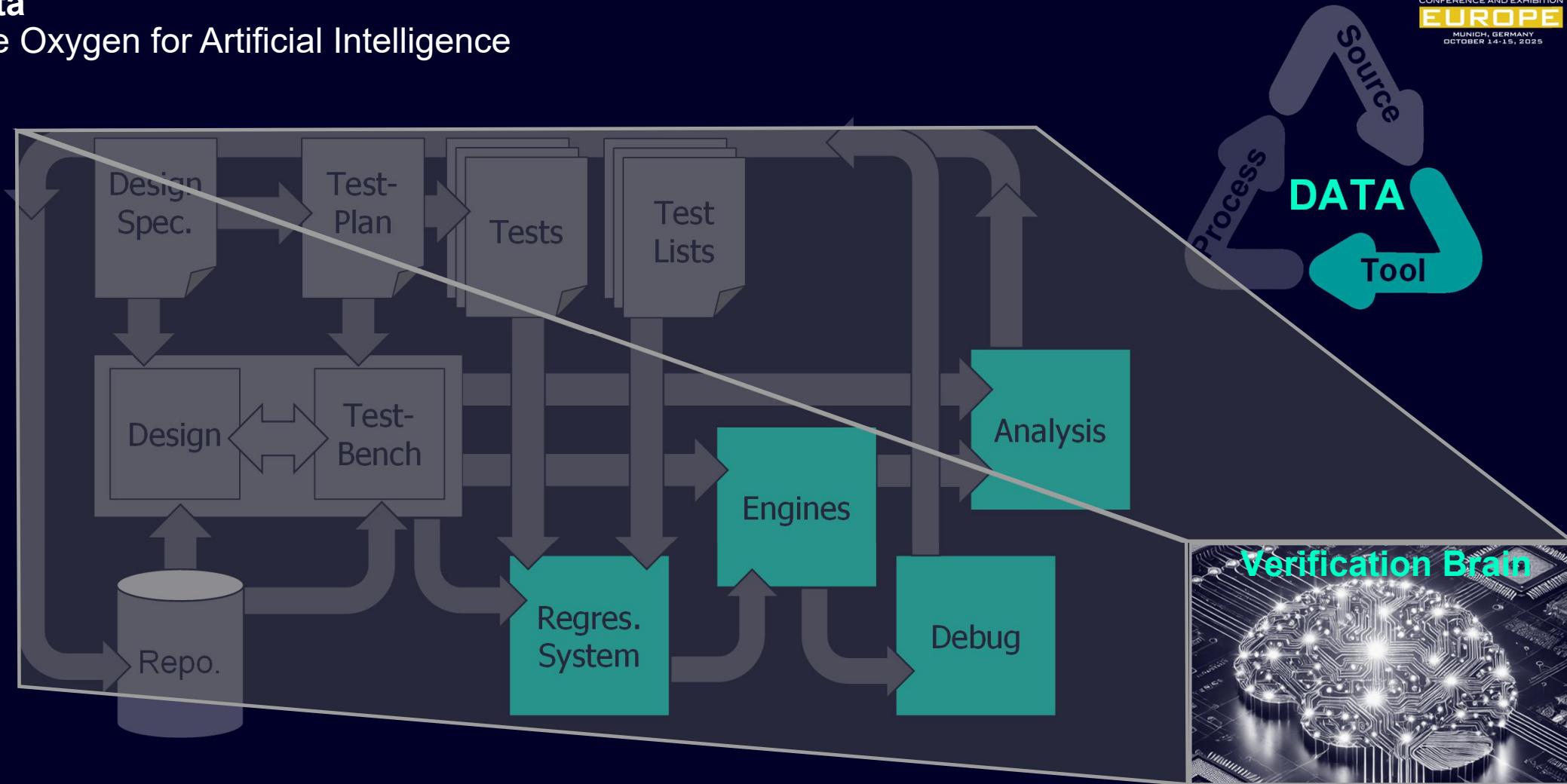


FEWER WORKLOADS

Predictive technologies to stream-line & accelerate verification

Data

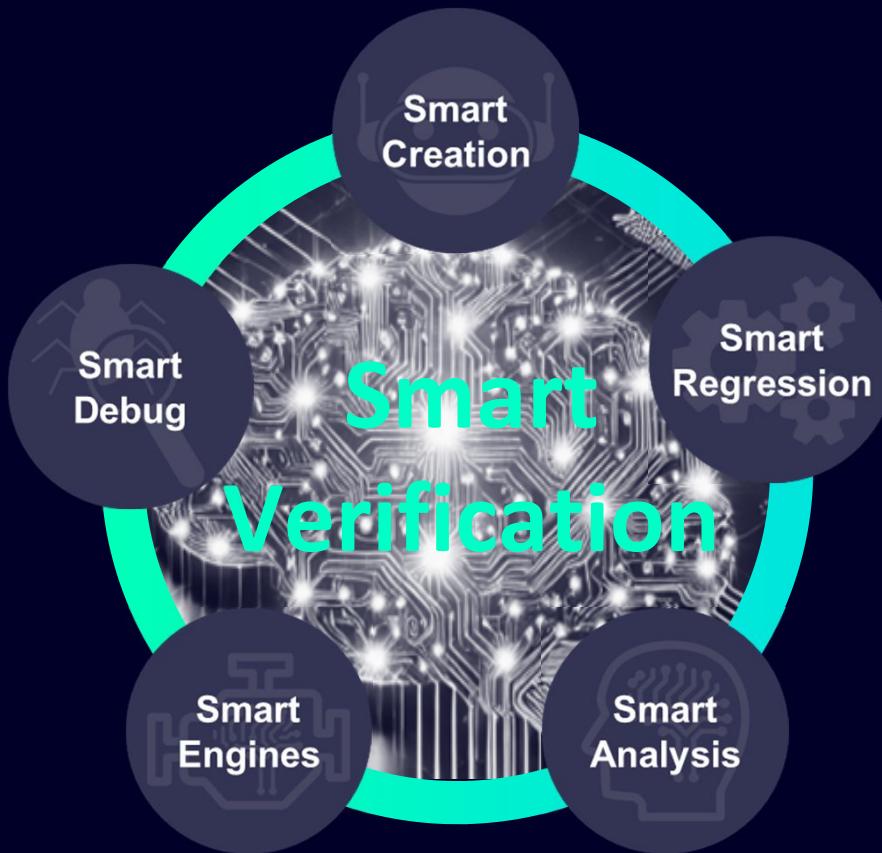
The Oxygen for Artificial Intelligence



Every Aspect can Benefit from AI

Smart Verification

Accelerating Functional Verification

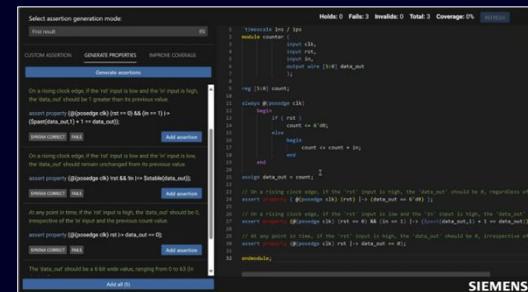
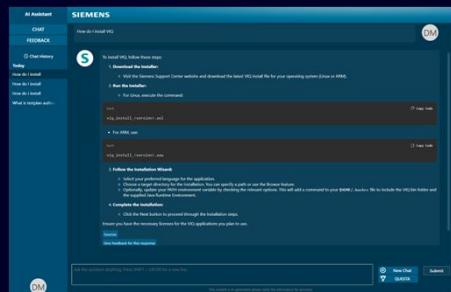
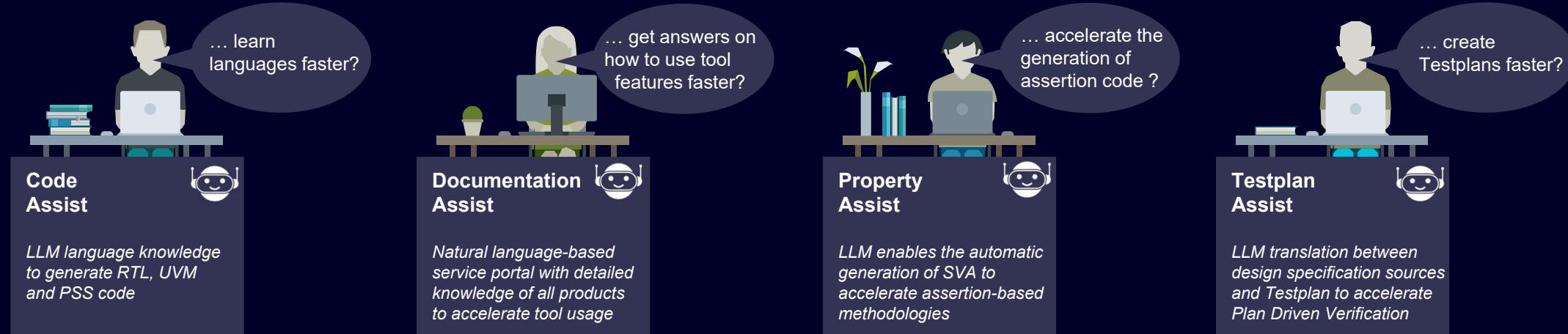


Solving Creation Challenges with Smart Creation

How Can AI/ML assist me to ...

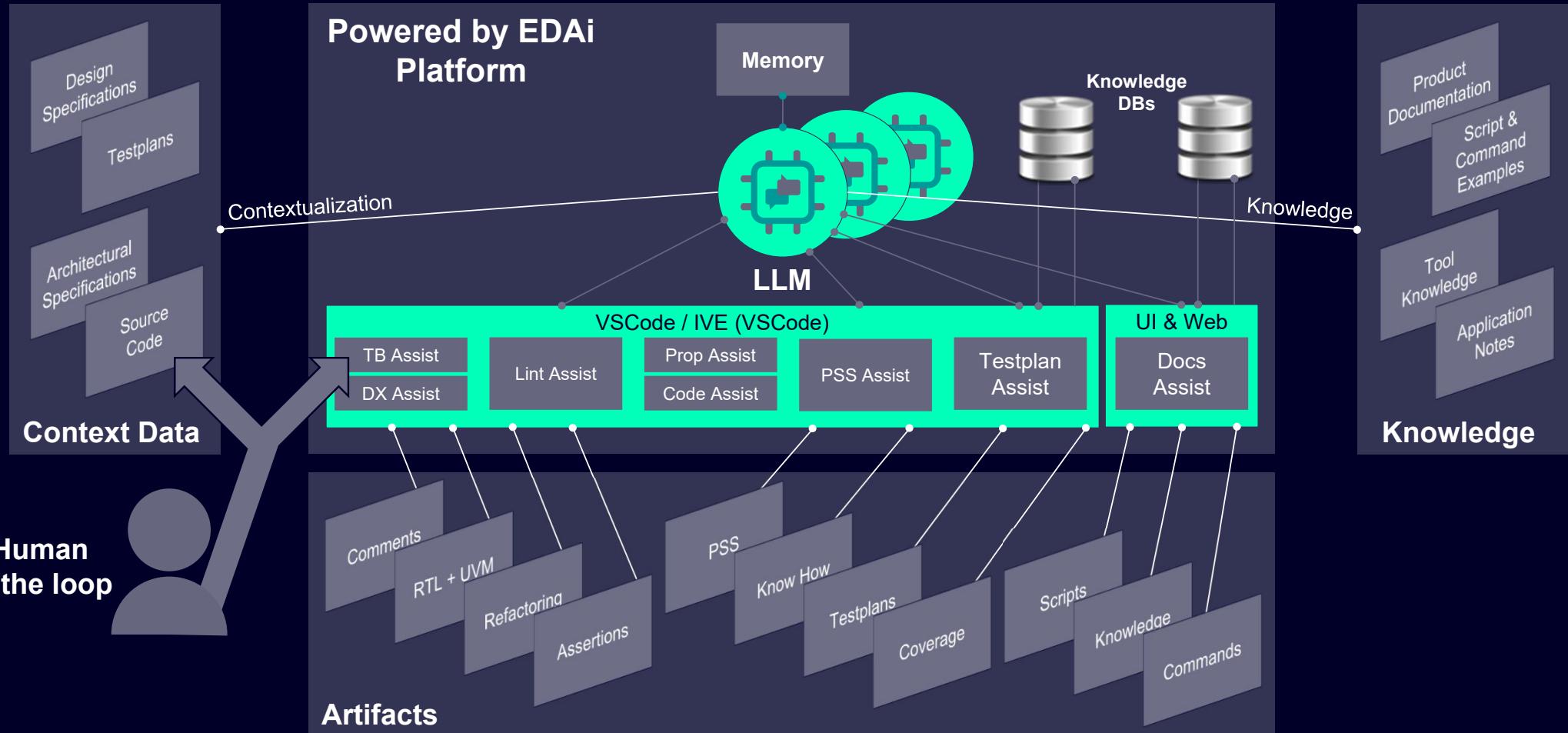


2025
DESIGN AND VERIFICATION
DVCON
CONFERENCE AND EXHIBITION
EUROPE
MUNICH, GERMANY
OCTOBER 14-15, 2025



Delivering Productivity to Functional Verification

Generative AI Powered by Siemens EDAi Platform



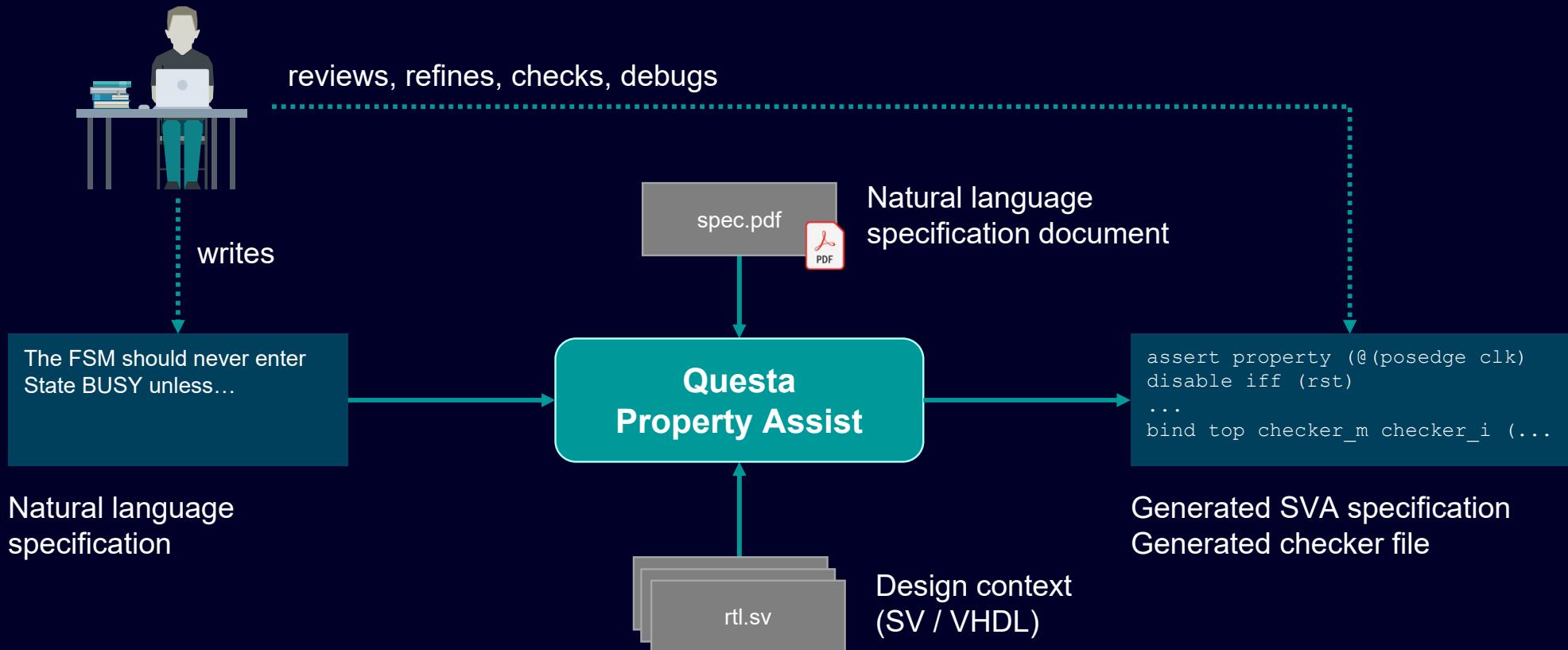
Smart Creation Generative AI

Faster Engineers with Property Assist

Hans-Joerg Peter - R&D Product Lead

What is Questa Property Assist?

Productivity for both Design and Verification Engineers



Questa Property Assist's Approach

Extending the power of Large Language Models

Additional Knowledge

Use RAG for additional knowledge and integration with data sources such as Fuse



Shielding

Use static and formal methods to rank, filter, and refine the LLM-generated properties



Interactivity

Use integrated UIs to let the user debug and take action during the generation process

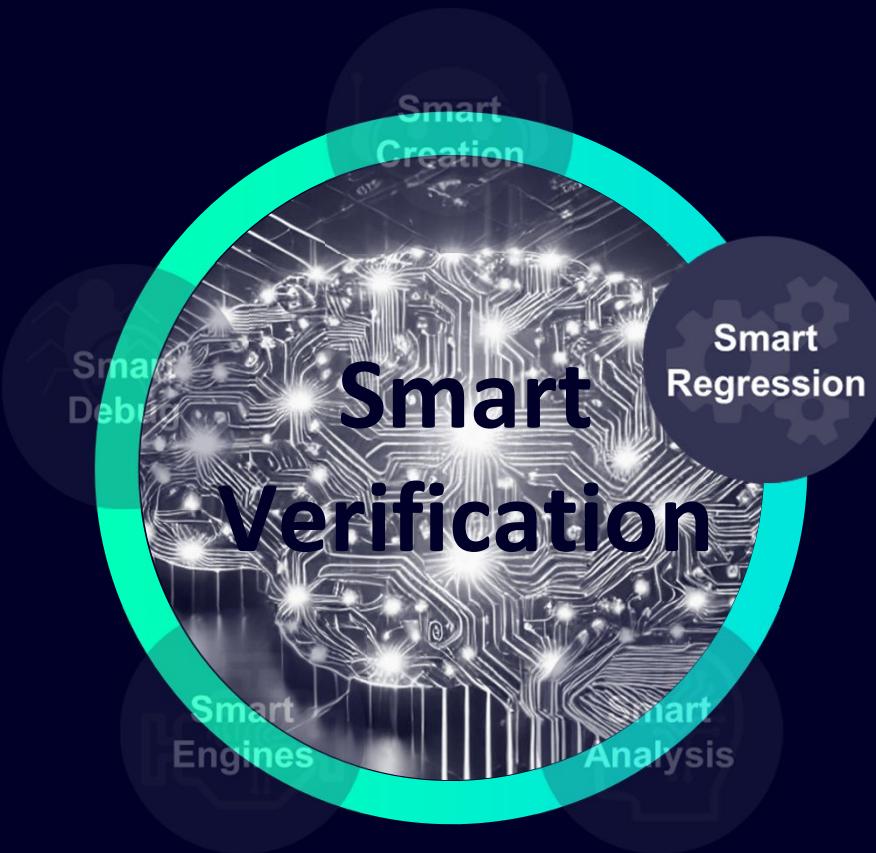


Smart Creation
Generative AI

Faster Engineers
with
Property Assist Demo

Smart Verification

Accelerating Regressions

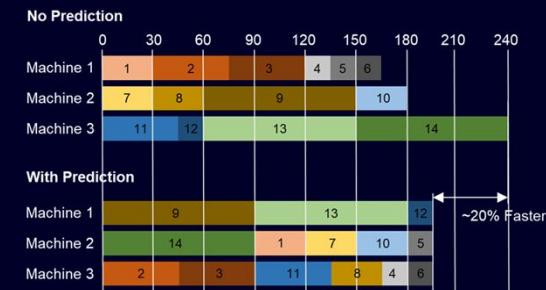
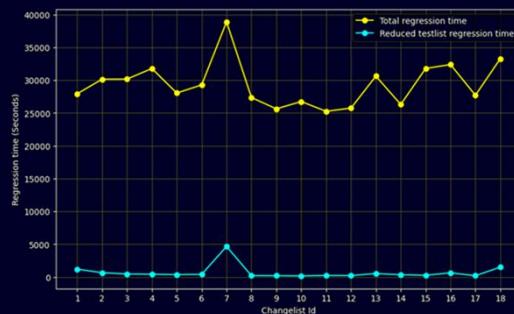
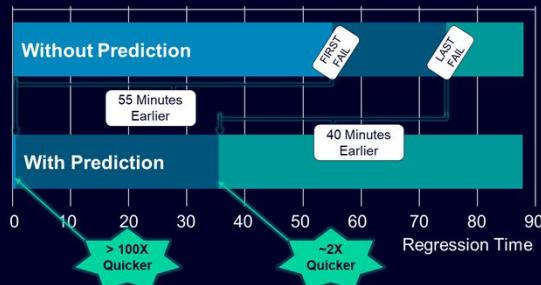
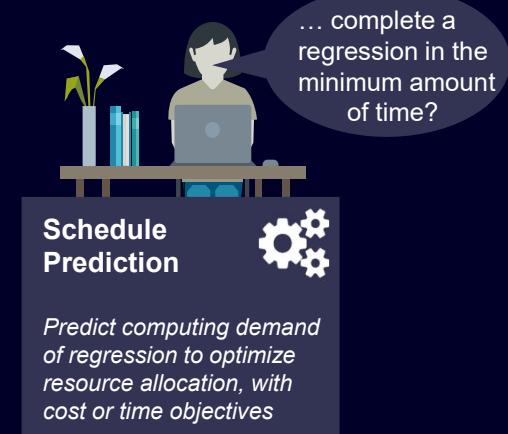
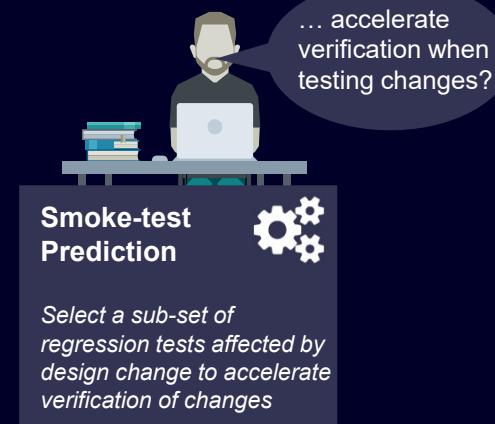


Solving Regression Challenges with Smart Regression

How Can AI/ML ...



FEWER WORKLOADS



Smart Verification

Accelerate Debug Turn-around

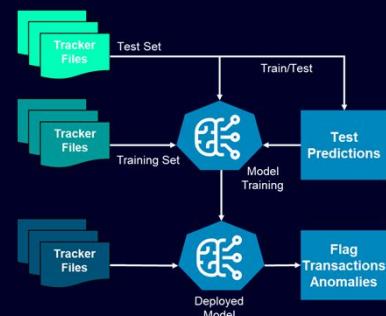
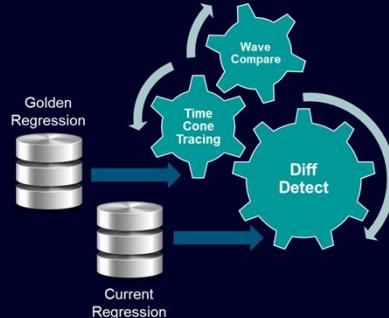
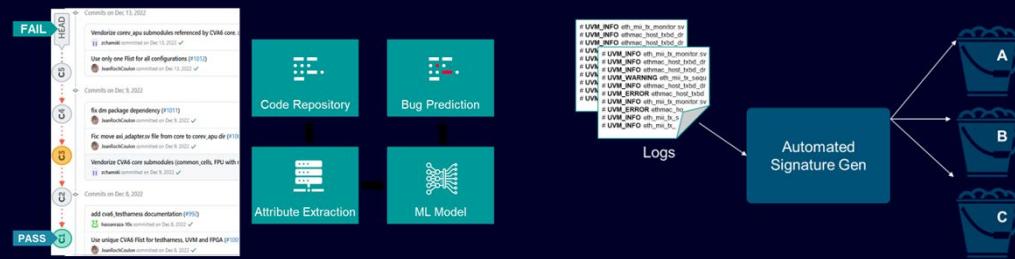
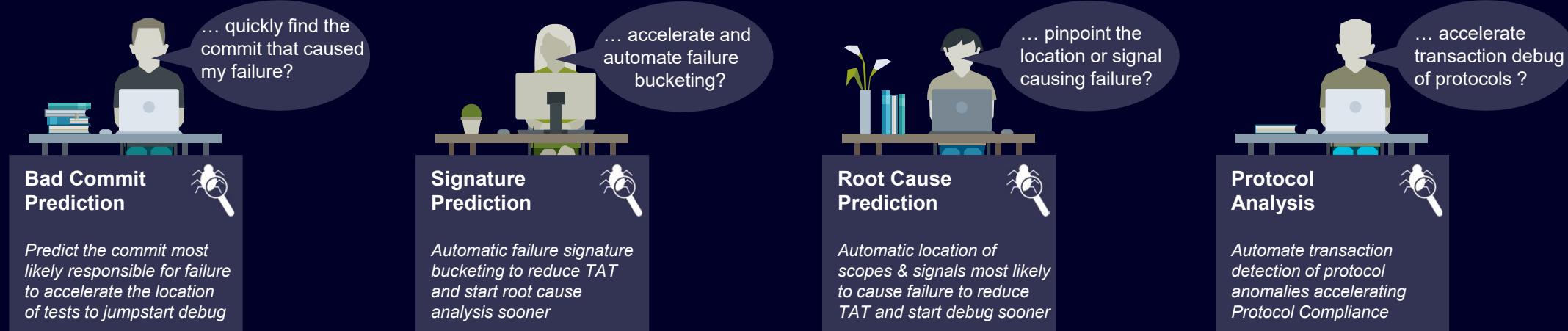


Solving Debug Challenges with Smart Debug

How Can AI/ML ...



The logo for DVCon Europe 2025 features the year "2025" in a large, bold, black font at the top. Below it, the word "DVCON" is written in a large, bold, black font with a yellow outline. Underneath "DVCON", the words "DESIGN AND VERIFICATION" are written in a smaller, black font. At the bottom, the word "EUROPE" is written in a large, bold, yellow font. The entire logo is set against a white background.



Smart Debug & Regression Predictive AI

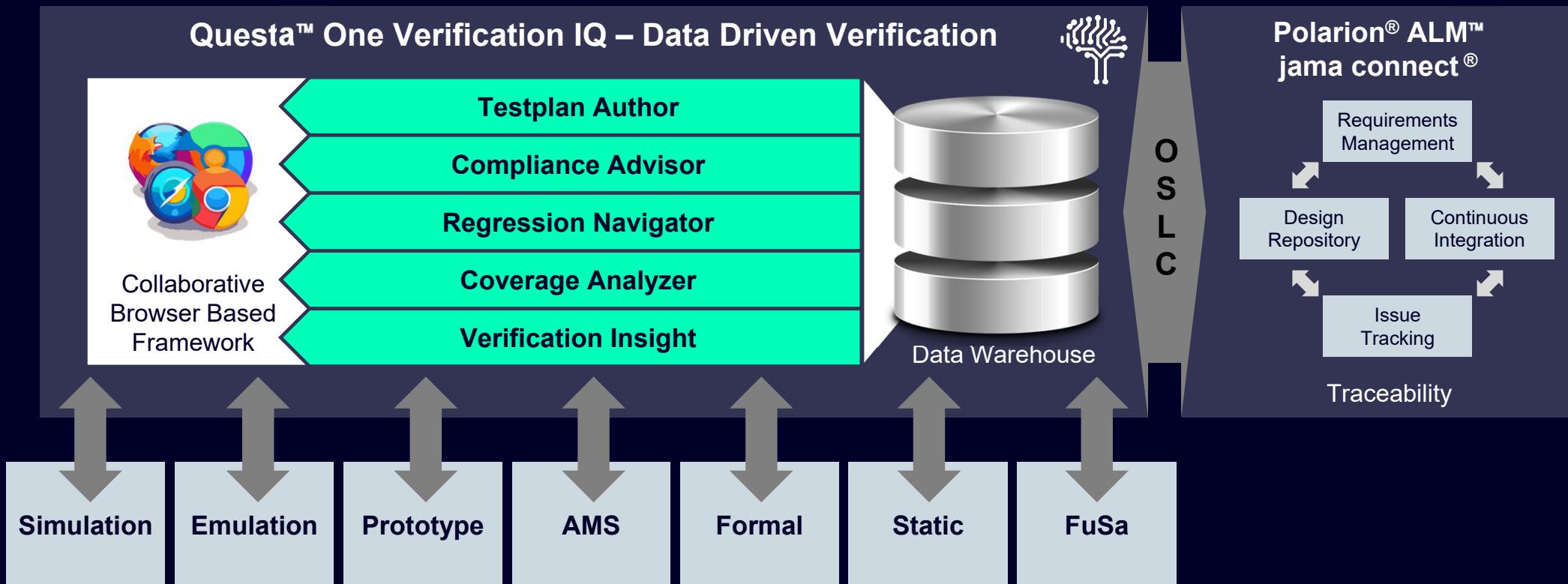
Faster Engineers & Fewer Workloads
with
VIQ Regression Navigator

Mark Carey – Product Engineer

Launched
Jan 2023

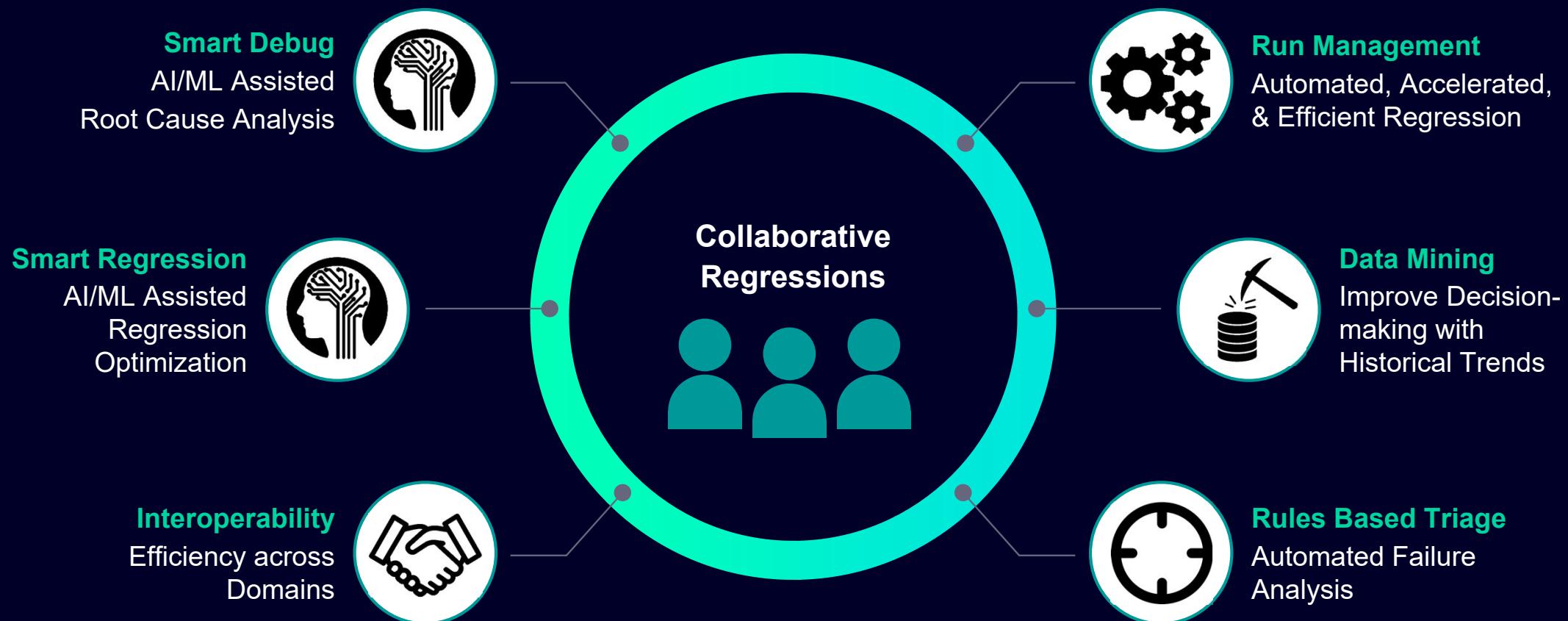
Questa™ One Verification IQ Maximizes Productivity

Data-Driven Verification Management Solution



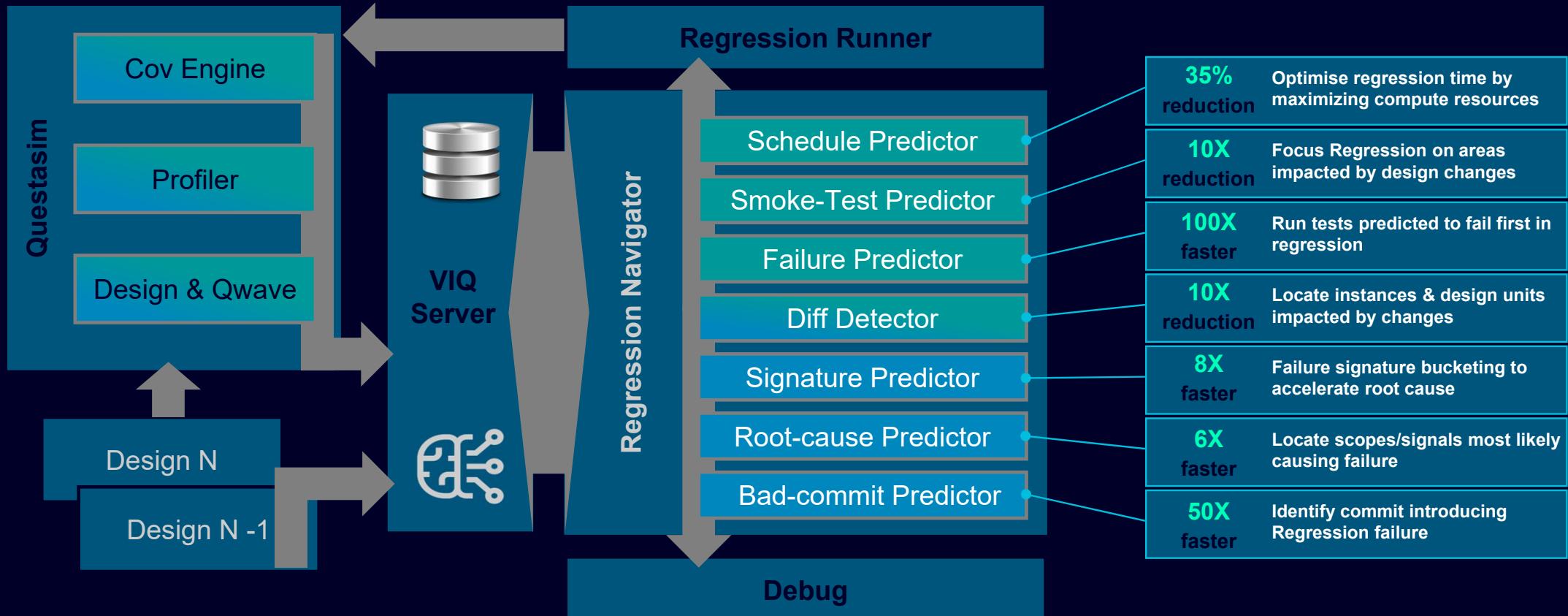
Optimize Regression Cycles & Accelerate Turn-Around Times

VIQ Regression Navigator Provides Intelligent Regression & Debug



VIQ Regression Navigator

Applying AI Prediction with *Smart Regression and Smart Debug*



Smart Debug & Regression Predictive AI

Faster Engineers & Fewer Workloads
with
Regression Navigator Demo

Smart Verification

Accelerate Verification Analysis



Solving Analysis Challenges with Smart Analysis

How Can AI/ML ...



The logo for DVCon Europe 2025. It features the year "2025" in a large, white, rounded font at the top right. Below it, the word "DVCON" is written in a large, bold, white, sans-serif font. Underneath "DVCON", the words "DESIGN AND VERIFICATION" are in a smaller, white, sans-serif font. At the bottom, the word "EUROPE" is written in a large, bold, white, sans-serif font. The background of the logo is dark blue.



Pattern Analysis

Automatically extract common expressions to accelerate stimulus gen or pattern exclusion



Cross Hole Analysis

Automatically extract the worst cross coverage holes to accelerate generation of new stimulus to cover holes

... accelerate cross hole closure



CDC/RDC Assist

Automate message clustering to reduce noise, generate constraints & corrective suggestions

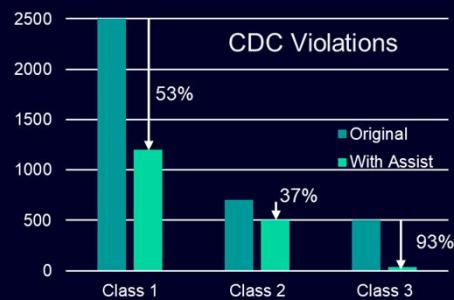
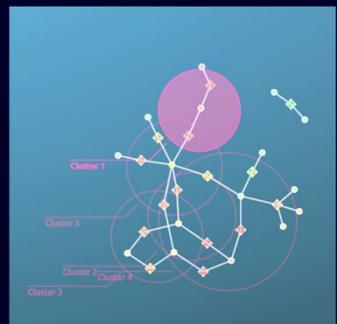
... group common crossing issues & configure tool?



Log Message Clustering

Automate message clustering to reduce noise, and generate easier to understand output

... accelerate the understanding of log output ?



Smart Analysis Analytical AI

Faster Engineers
with
VIQ Coverage Analyzer

Mark Carey – Product Engineer

Accelerate Coverage Closure

VIQ Coverage Analyzer Provides Intelligent Closure

Pattern Analysis

Smart Closure,
Expression Analysis



Hole Analysis

Smart Closure, Cross
Hole Analysis



Team-base Communication

Accelerate Closure with
Enhanced Team
Communication



Collaborative Coverage Closure



Unified Coverage

Efficient Transition of
existing methodology



Analytical Navigation & Visualization

Accelerate
Understanding and
Closure



Exclusion Management

Accelerate Exclusion
Application and Auditing

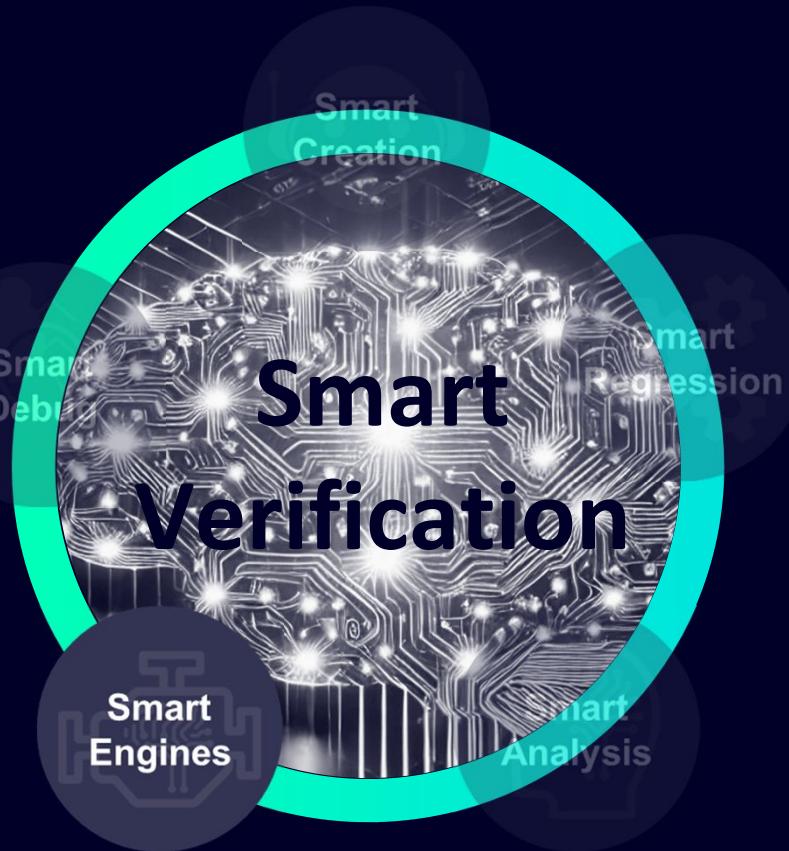


Smart Analysis Analytical AI

Faster Engineers
with
Coverage Analyzer Demo

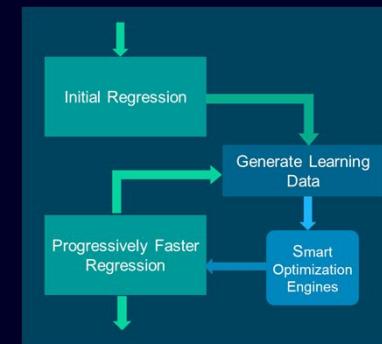
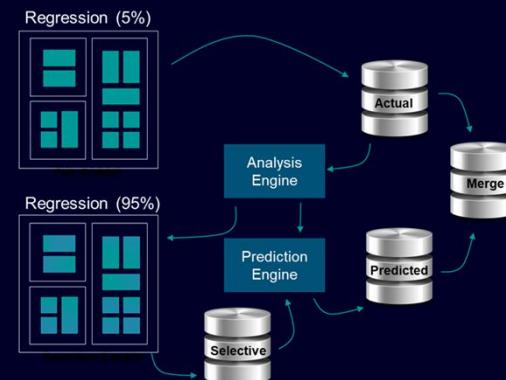
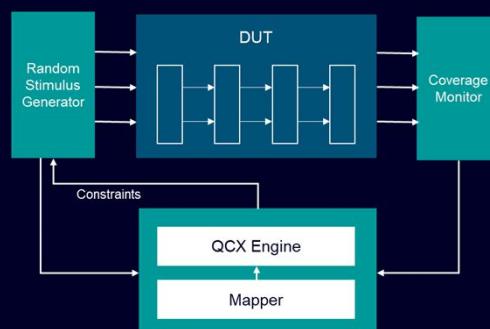
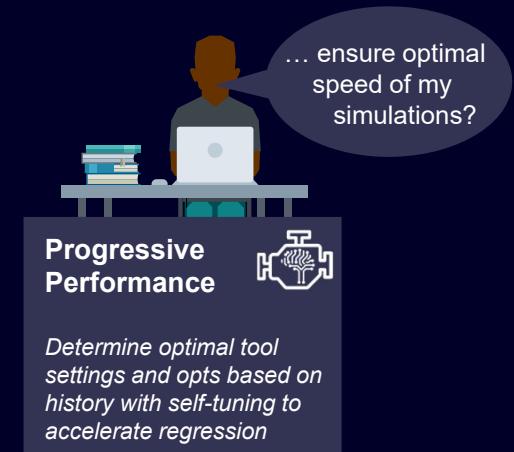
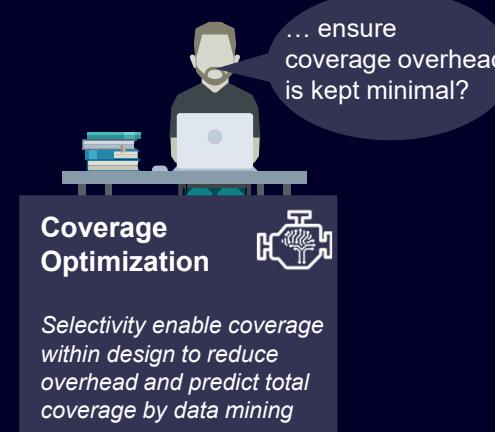
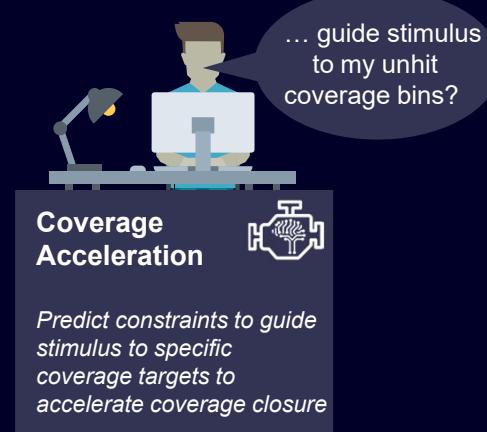
Smart Verification

Accelerate Verification Engines



Accelerate Engines with Smart Engines

How Can AI/ML ...



Smart Engines
Predictive AI

Faster Engines
with

QCX – Questa Coverage Accelerator

Gabriel Chidolue – Product Engineering Manager

QuestaSim QCX: Coverage Closure Acceleration

Coverage Driven Stimulus Generation

Coverage Driven Stimulus

Each randomization produces non-redundant stimulus using coverage as a goal
User can provide coverage intent at command line to guide stimulus

Distribute Coverage Targets

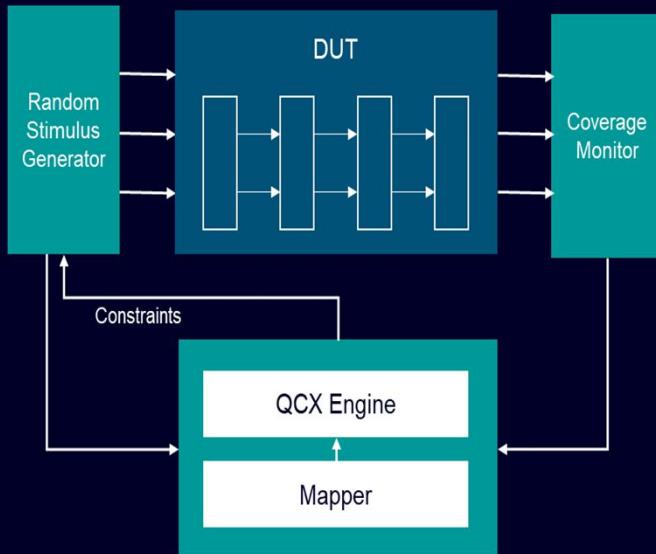
Leverage regressions to distribute unique coverage goals across parallel simulations
Load existing coverage as a starting point to avoid duplicate effort

Built into QuestaSim

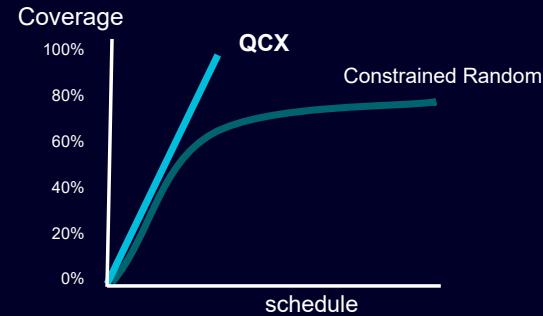
Part of constraint solver, optimized for minimal overhead
Enabled with a single switch at optimization and simulation

Smart Engines

Applying Predictive AI to our Engines

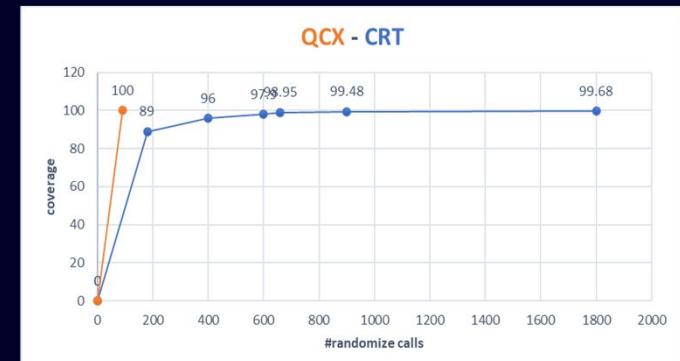


Questa Coverage Acceleration (QCX)



- Coverage mapping provides feedback enabling smarter stimulus generation
- ML assisted to find additional connections between stimulus and coverage targets
- Achieve coverage goals faster (Save on Project time)

Real Customer Designs



QCX Demo Design

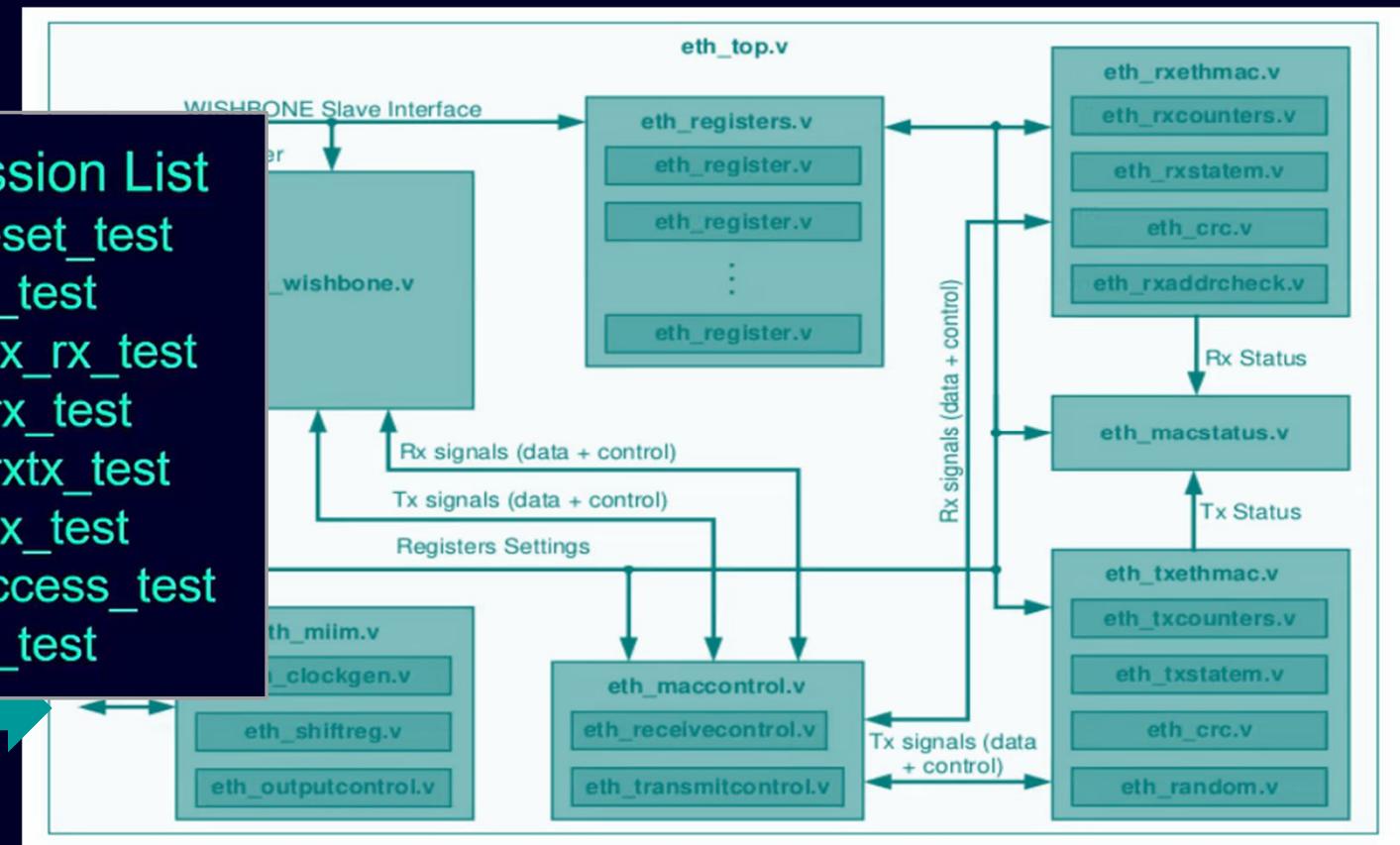
Ethernet IP Core and UVM Testbench

WB UVM Sequence Stimulus

MII UVM Sequence Stimulus

Baseline Regression List

- ethmac_reg_reset_test
- ethmac_tx_pkt_test
- ethmac_rand_tx_rx_test
- ethmac_rand_rx_test
- ethmac_rand_rxtx_test
- ethmac_rand_tx_test
- ethmac_reg_access_test
- ethmac_tx_crc_test



Smart Engines
Predictive AI

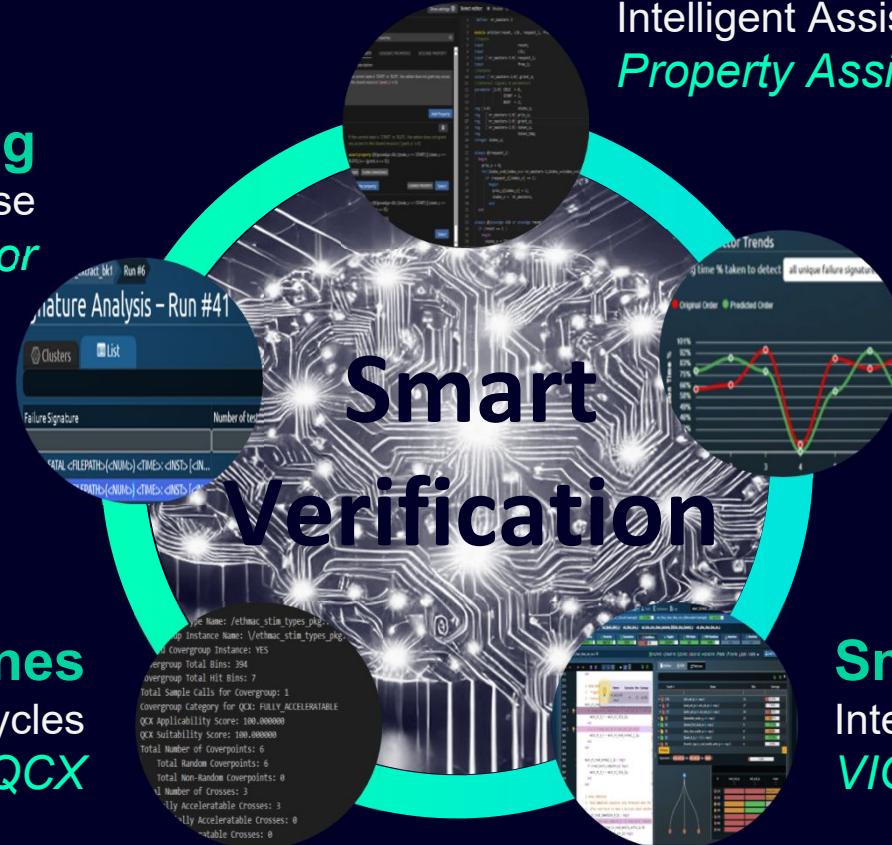
Faster Engines
with
QCX Demo

AI Maximising Verification Productivity

Faster Engines, Faster Engineers and Fewer Workloads

Smart Debug

Intelligent Root-cause
VIQ Regression Navigator



Smart Engines

Intelligent Verification Cycles
QCX

Smart Analysis

Intelligent Insights
VIQ Coverage Analyzer

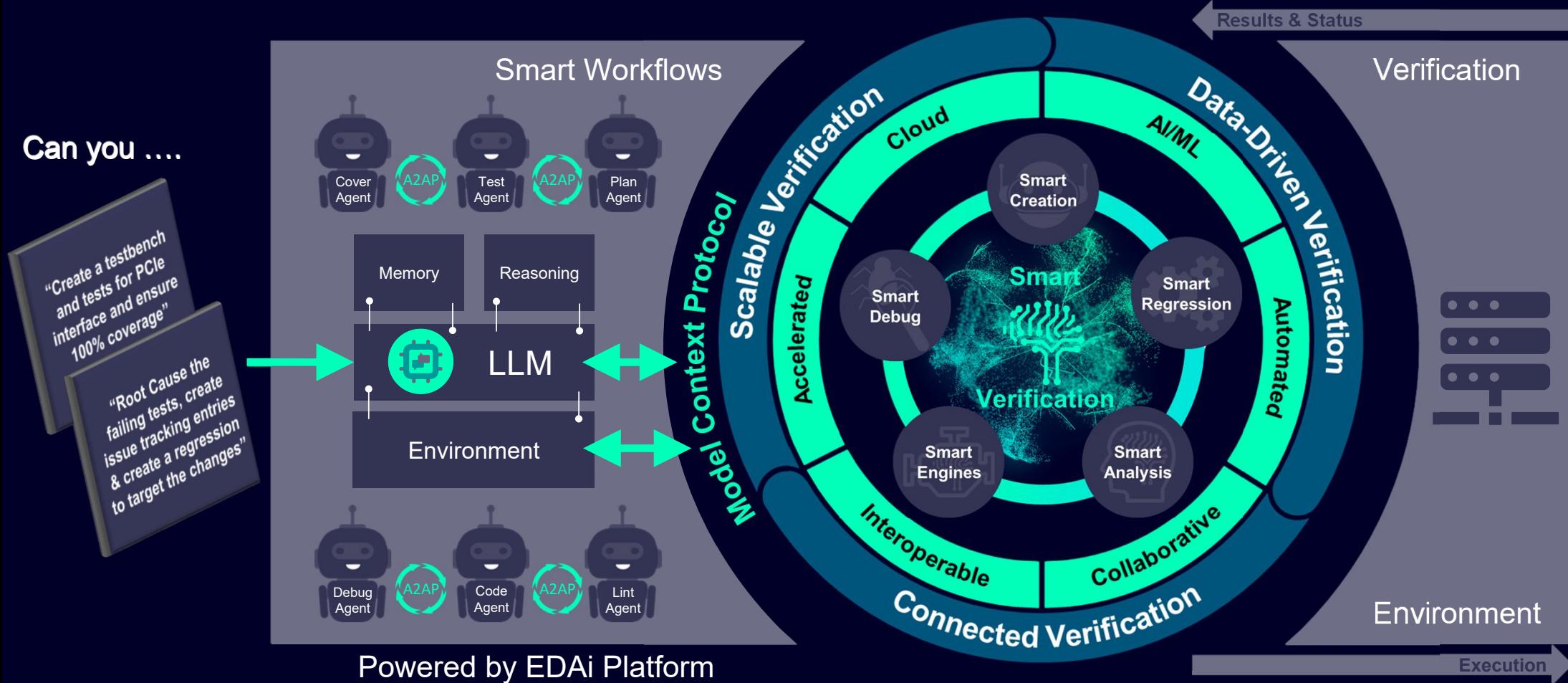
Smart Verification

Looking at The Future
of

AI Driven Design & Functional Verification

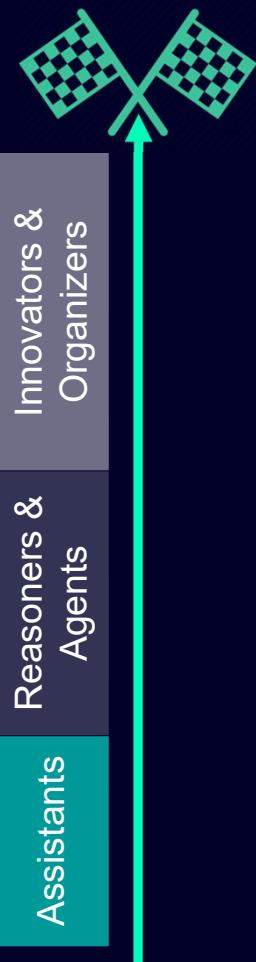
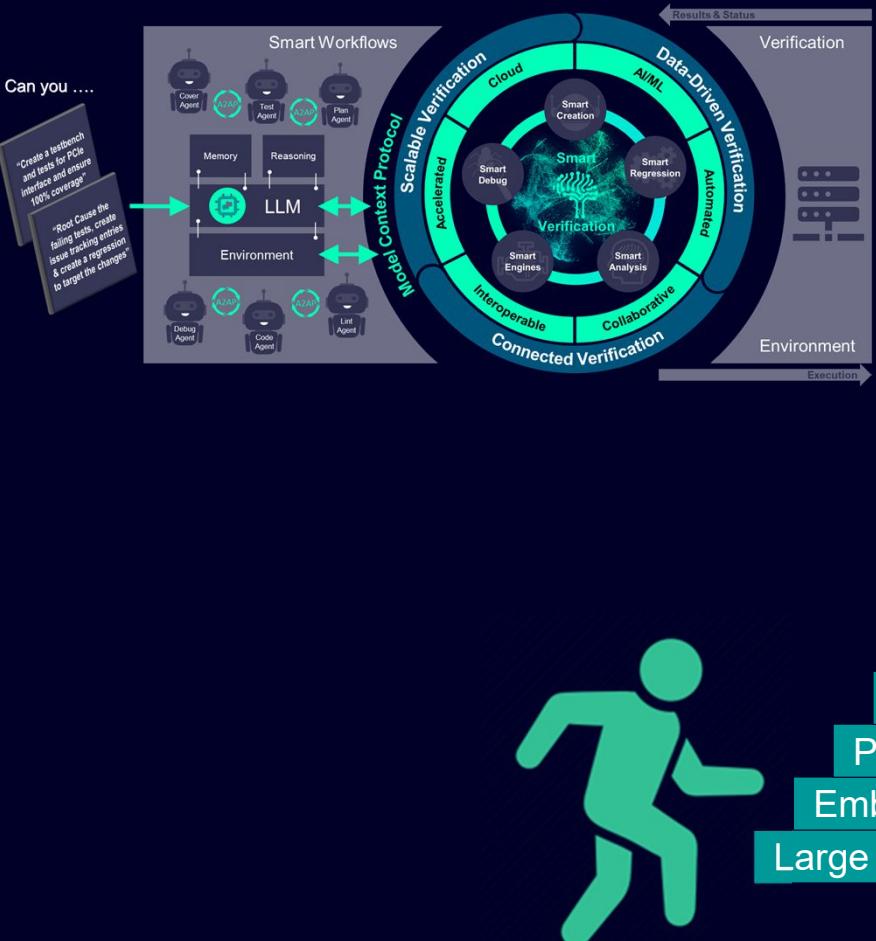
Expansion to Agentic AI Assisted Verification Workflows

Connected, Scalable, Data-driven Verification Technologies



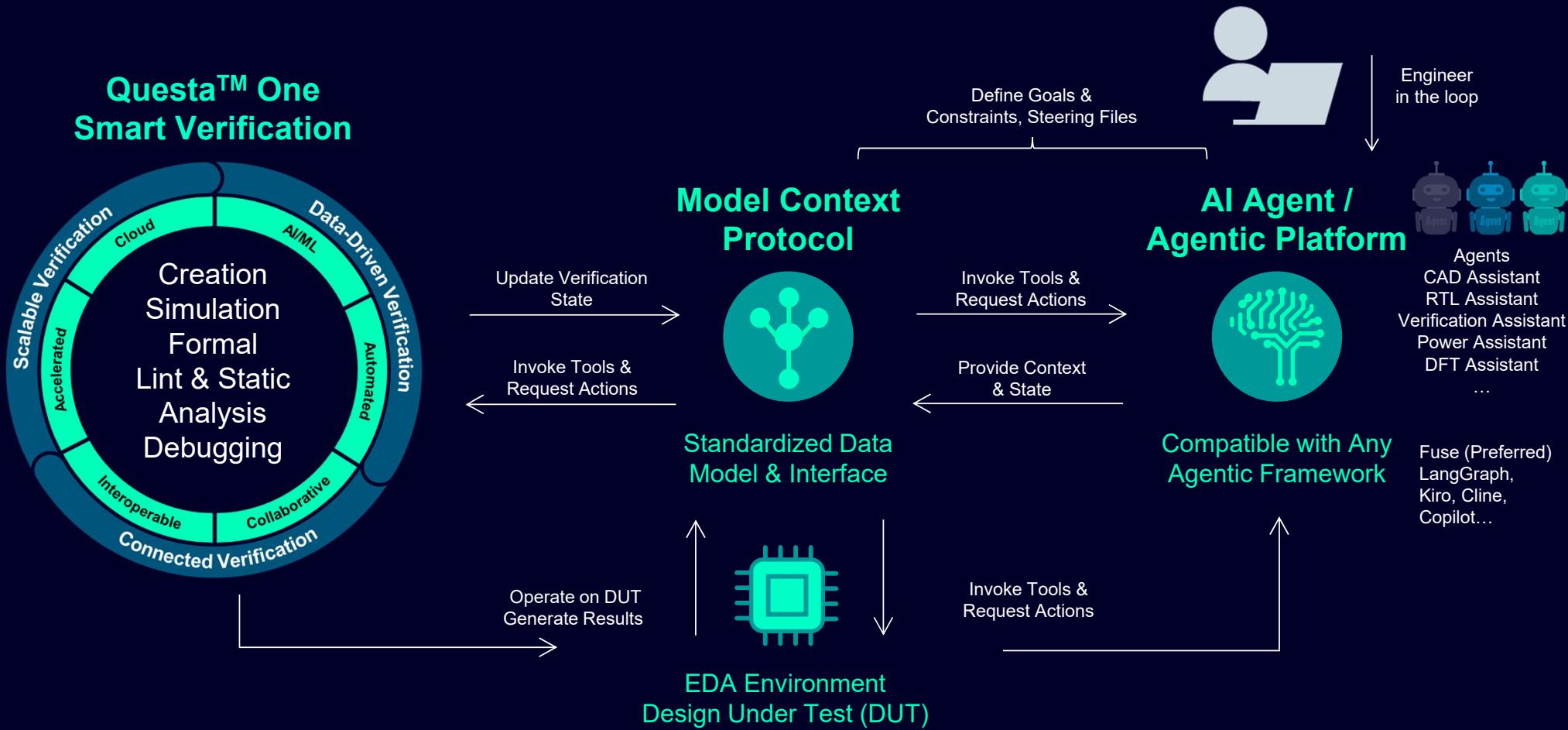
AI Assistants Just the Start

Smart Verification Staircase to Fully Autonomous Agents



Enabling Intelligent Agentic Automation

Questa™ One Enables Connection to AI Agents through a Standardized Context Protocol



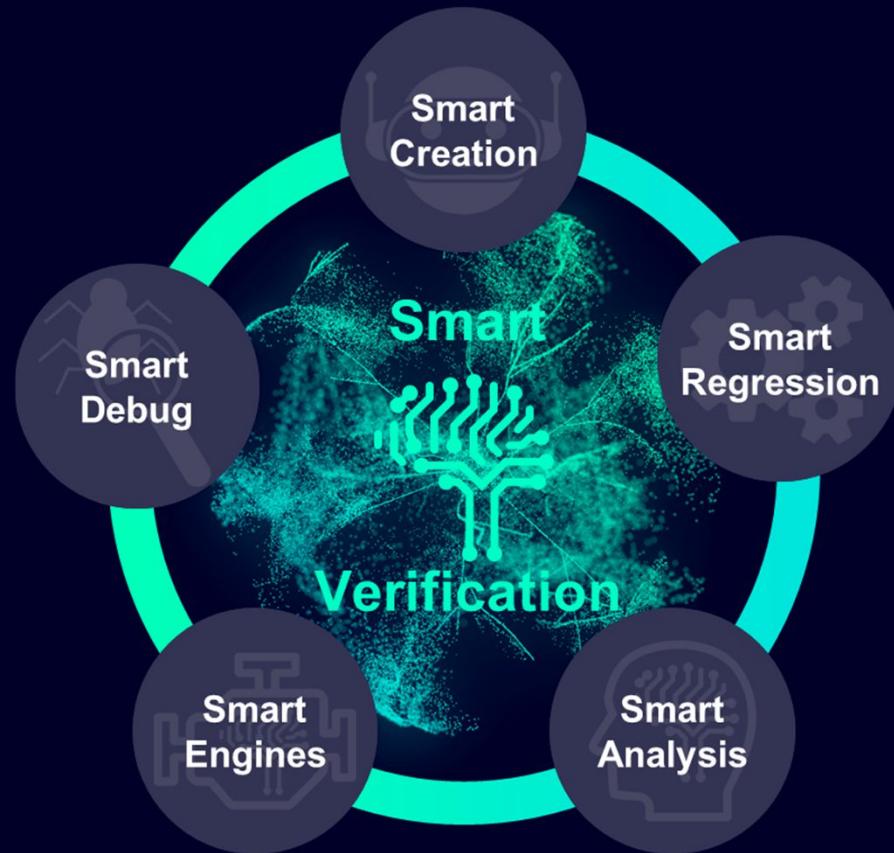
Smart Flows

Faster Closure Using Agentic RTL Sign-off

Agentic AI

Questa™ One Smart Verification

Transforming Functional Verification powered by AI



Faster Engines

Faster Engineers

Fewer Workloads

Contact

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