



Unleashing the Potential of Agentic AI Within Design & Functional Verification



Presenters



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Product Engineer
Coverage and Verification Management

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**

The Future

- A look at **The Future of AI Driven Functional Verification**



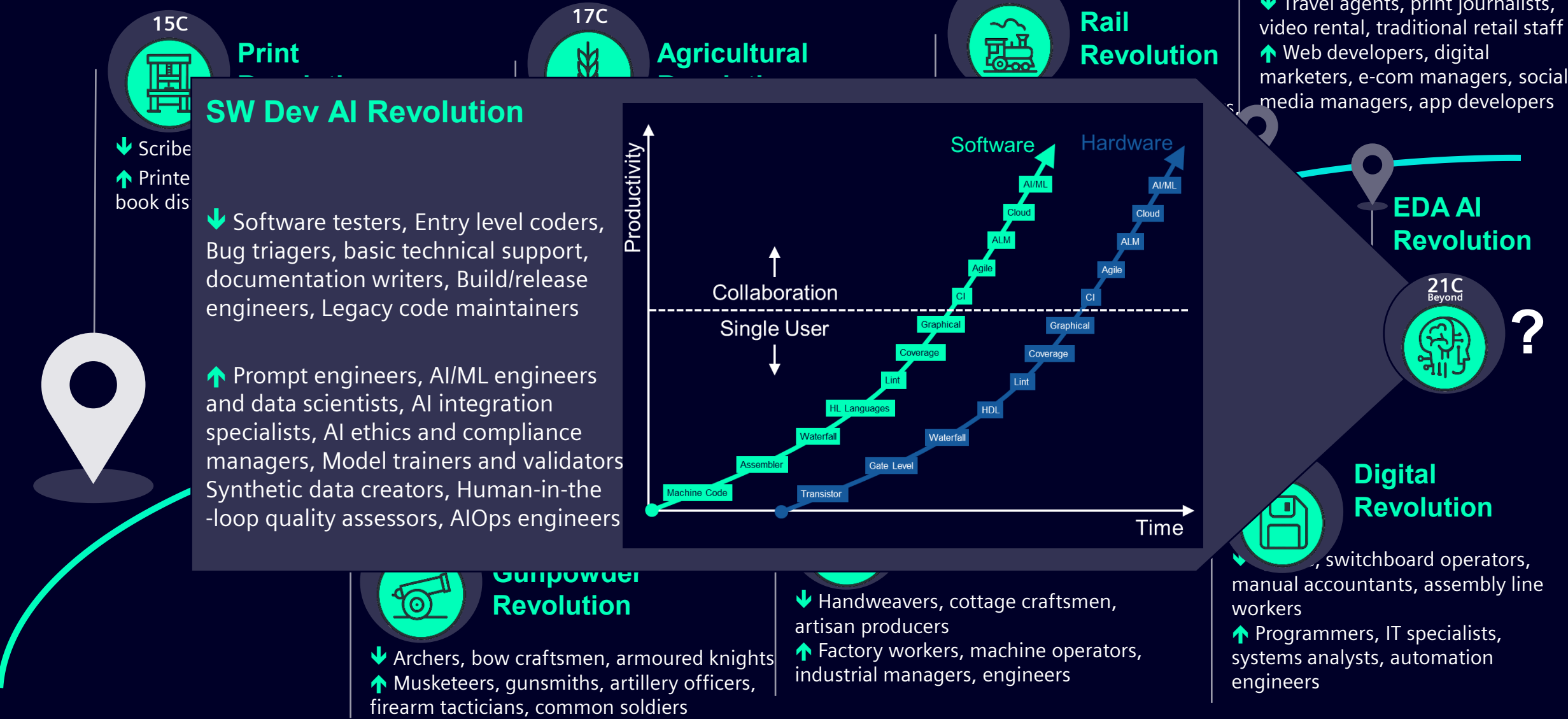
AI won't take your job, but
someone using AI will



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

Innovation Continually Reshapes Jobs

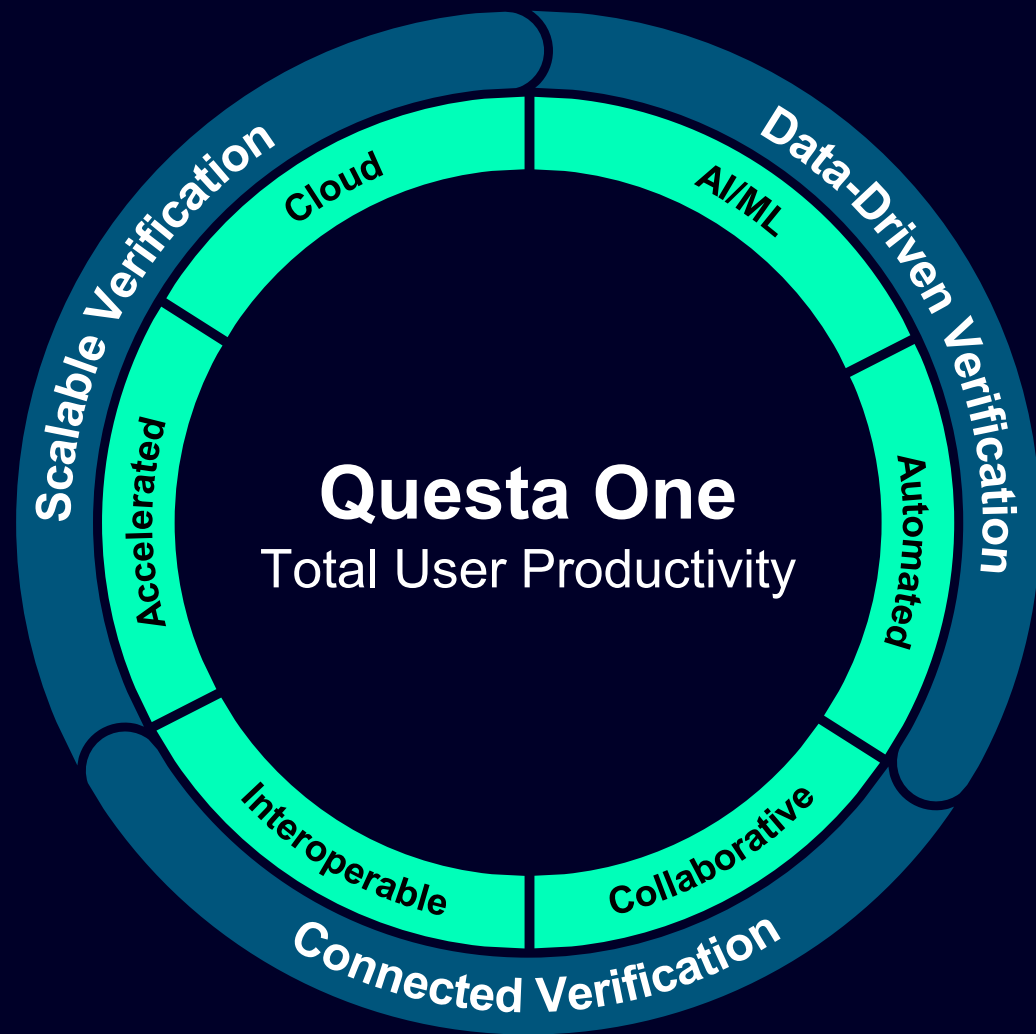
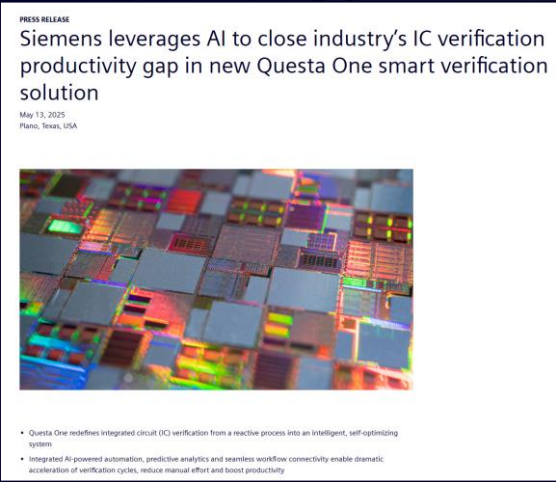
Transformative Change is the Constant in Story of Progress



Questa™ One Smart Verification Solution enabled by AI

Preparing for Transformation and Accelerating User Productivity

Launched at
U2U 13th May



Faster
Engines
▼

Faster
Engineers
▼

Fewer
Workloads
▼

- ✓ Delivering up to **5x** improved **Total User Productivity**
- ✓ **Scalable, connected, data-driven** infrastructure for transformation to **Agent based verification**

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 Verification IQ

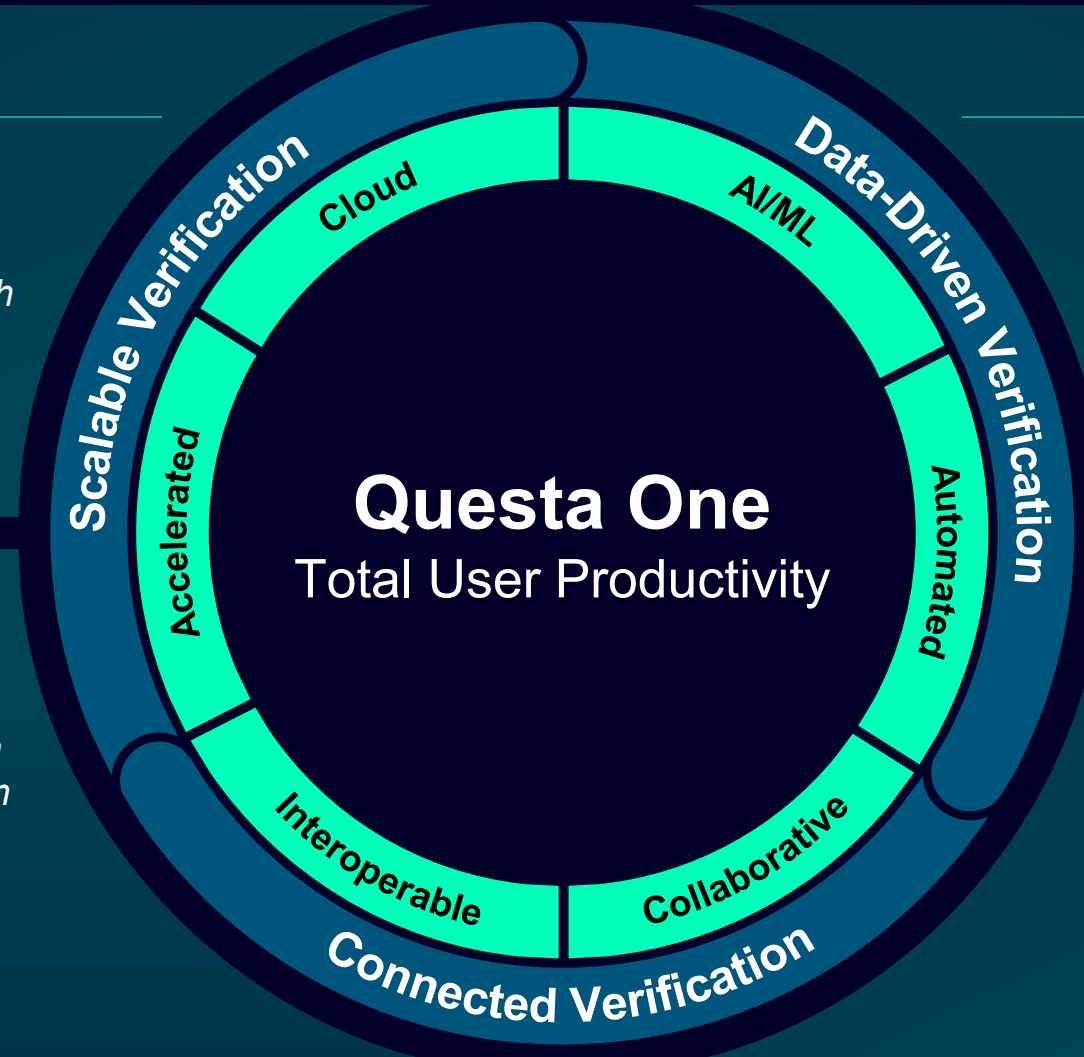
One smart common management solution that utilizes generative, analytic, & predictive AI to drive to verification closure faster, with fewer workloads

Questa One SFV

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

Questa One Avery VIP

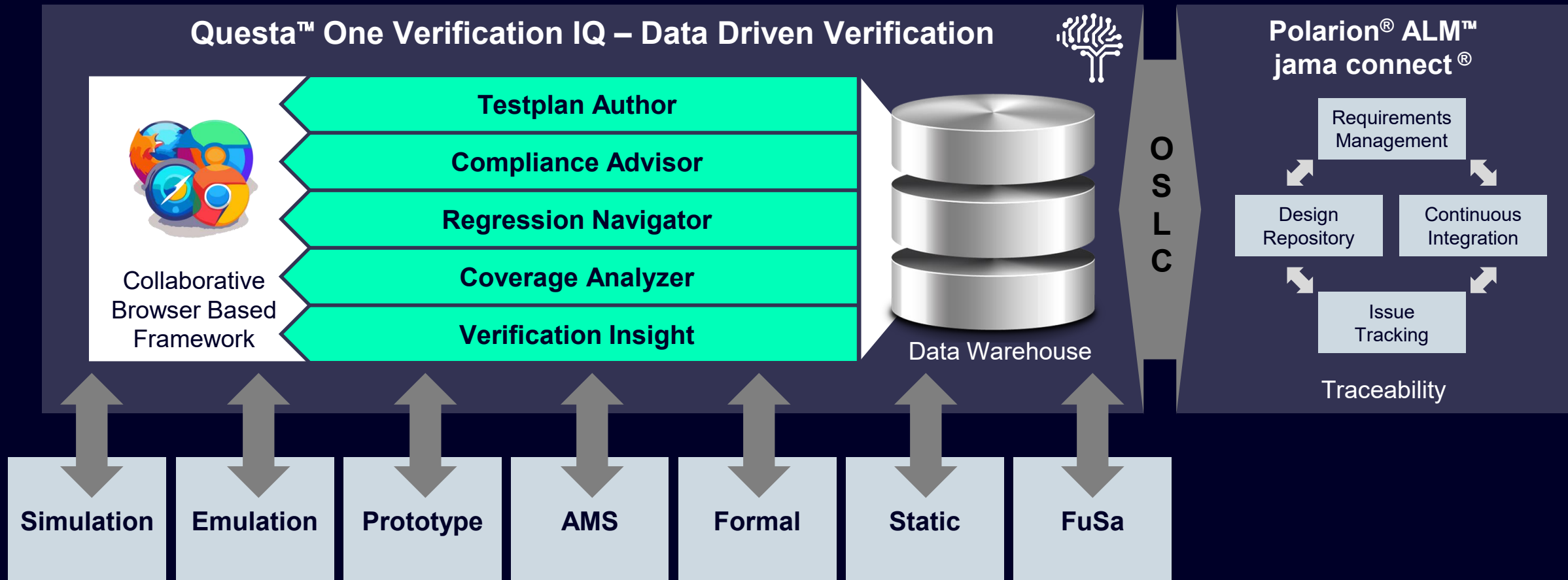
One industry-leading VIP solution that supports 3DIC & chiplet verification from IP to SoC, seamlessly integrating simulation & emulation



Questa™ One Verification IQ Maximizes Productivity

Data-Driven Verification Management Solution

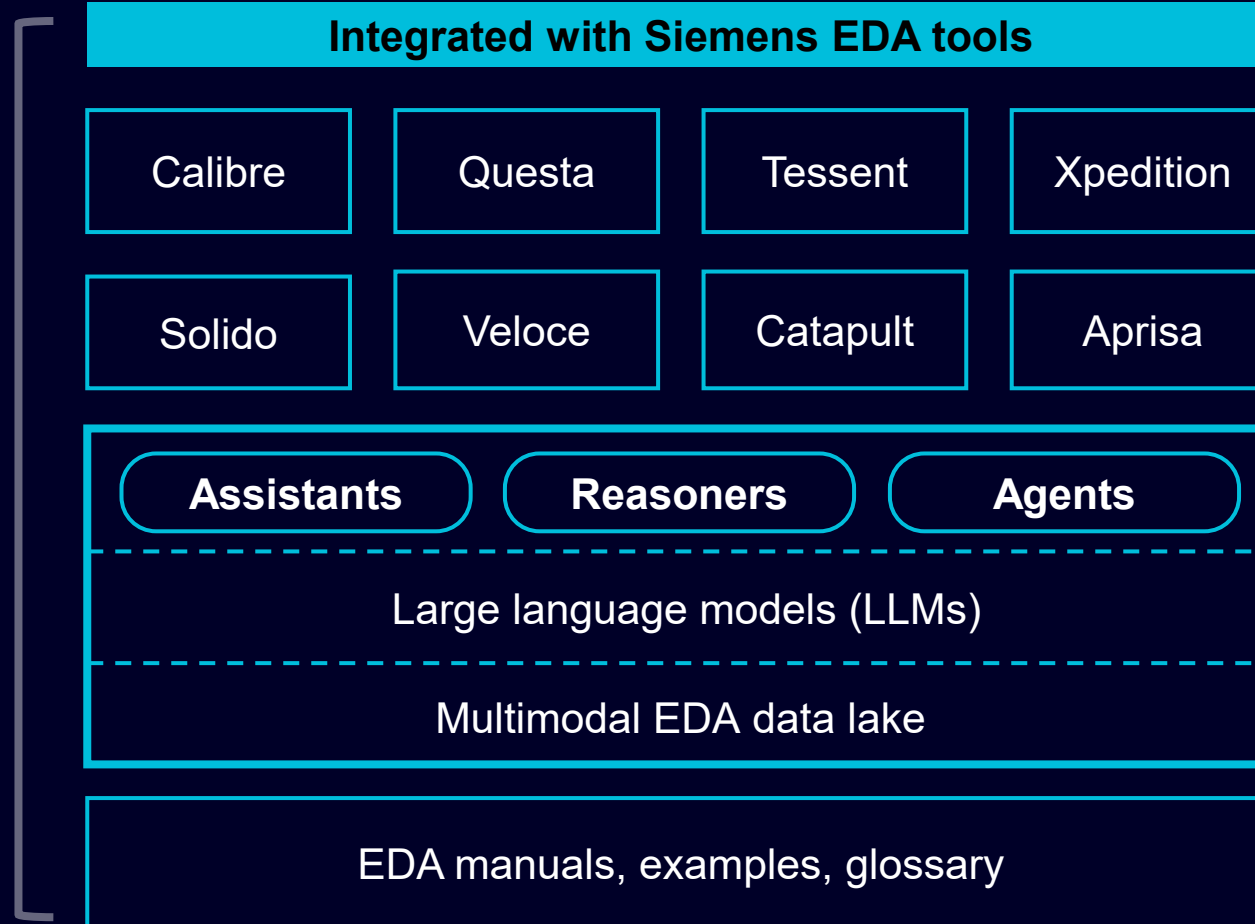
Launched
Jan 2023



AI platform by Siemens EDAi

Secure, on-prem / cloud, open, modular, and integrated with all Siemens EDA tools

Secure
environment,
on-premises
or **cloud-**
deployed



Focusing the Potential of AI for Verification Productivity

The Different AI Approaches and Product/Feature Targets

Analyze

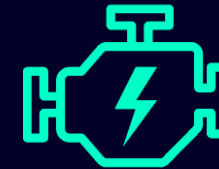
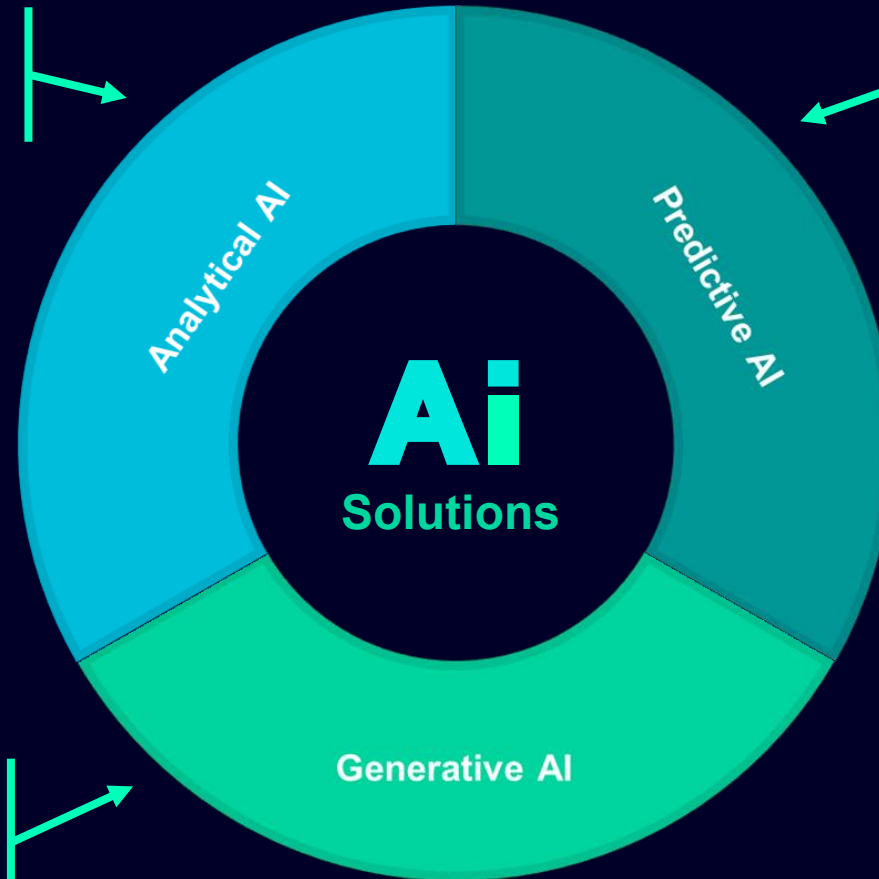
Identification of key data insights not practical with traditional methods

Optimize

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

Generate

Accelerate design creation, system optimization, and model abstraction



FASTER ENGINES

Complimenting heuristics and graph analytics in core engines & tools



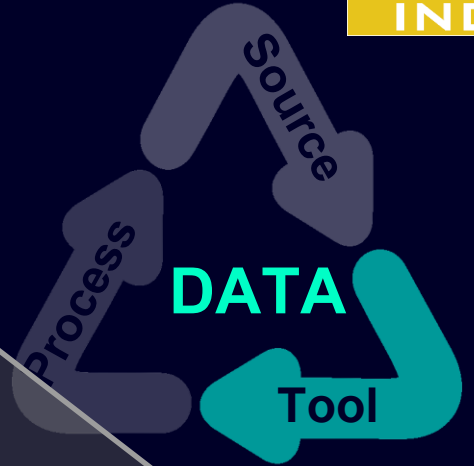
FASTER ENGINEERS

Enabling new creation, analysis, assistant and debug capabilities



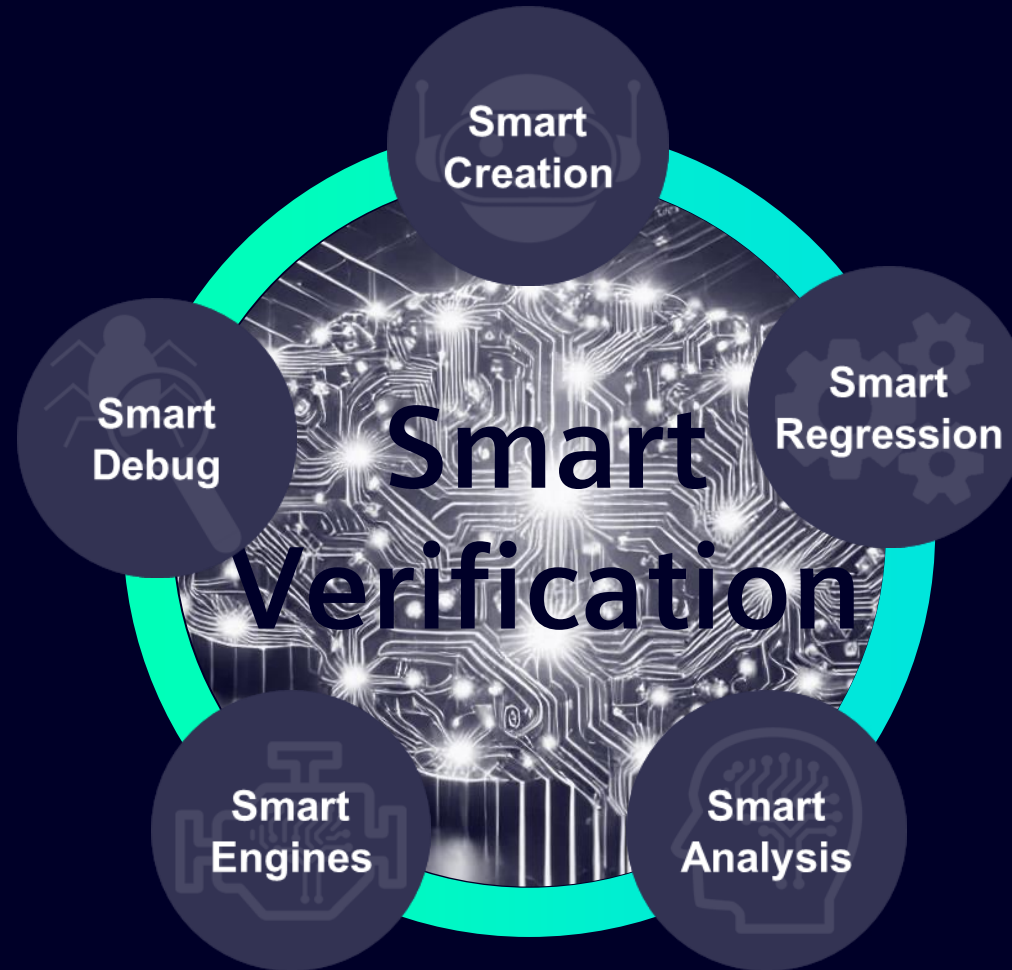
FEWER WORKLOADS

Predictive technologies to stream-line & accelerate verification



Smart Verification

Accelerating Functional Verification



Solving Creation Challenges with Smart Creation

How Can AI/ML assist me to ...



... learn
languages faster?

Code Generation



*Finetuned LLM trained on
niche language knowledge
to generate RTL, UVM
and PSS code*

... get answers on
how to use tool
features faster?

Documentation Exploration



*Natural language-based
service portal with detailed
knowledge of all products
to accelerate tool usage*

... accelerate the
generation of
assertion code ?

Property Assist



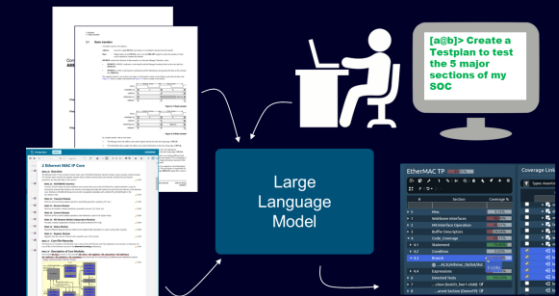
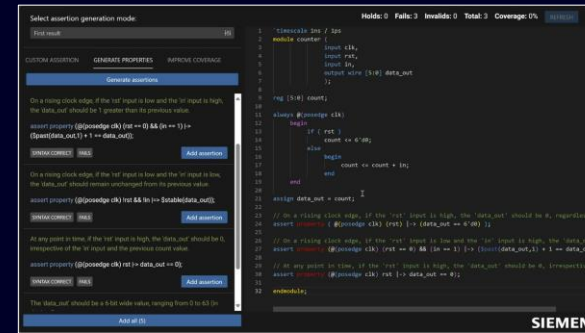
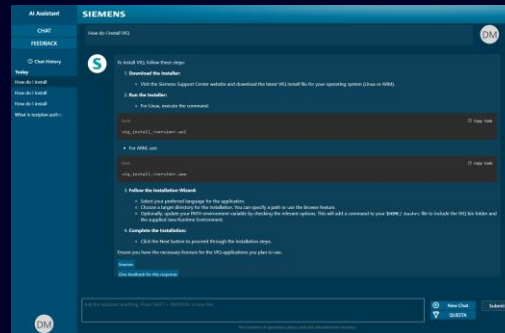
*Finetuned LLM enables the
automatic generation of SVA
to accelerate assertion-
based methodologies*

... create
Testplans faster?

Testplan Generation



*LLM translation between
design specification sources
and Testplan to accelerate
Plan Driven Verification*



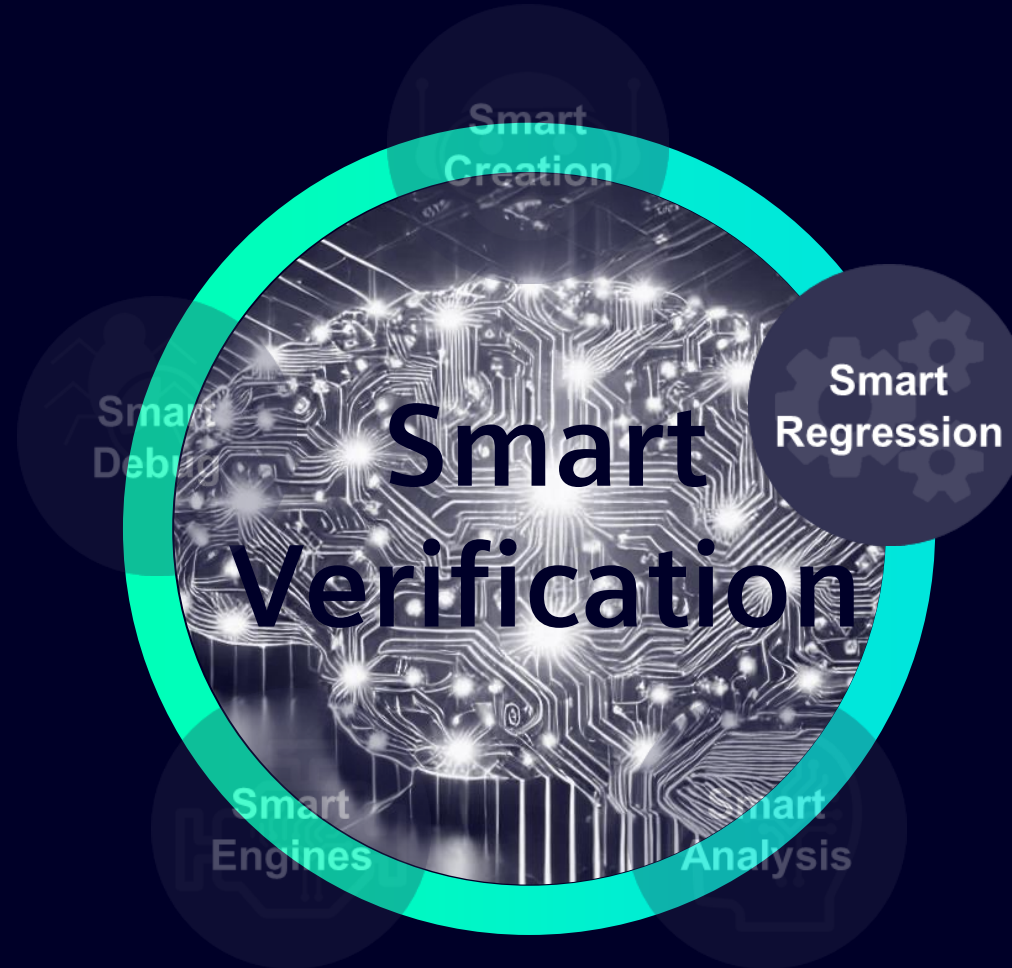
Smart Creation

Faster Engineers with Property Assist

Generative AI

Smart Verification

Accelerating Regressions



Solving Regression Challenges with Smart Regression

How Can AI/ML ...



FEWER WORKLOADS

... ensure failures occur as soon as possible?

Failure Prediction

Select the tests predicted to fail so they can be run early in the regression to speed time to failure

... accelerate verification when testing changes?

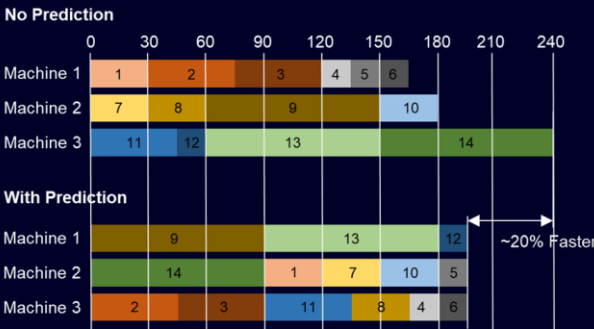
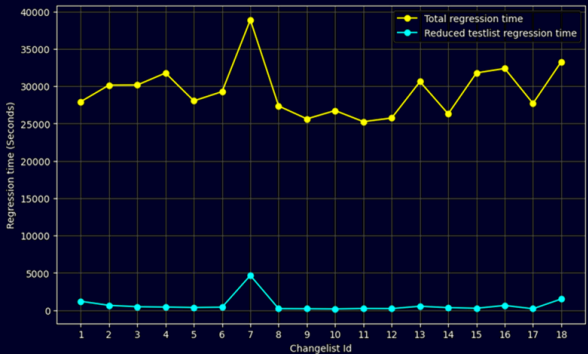
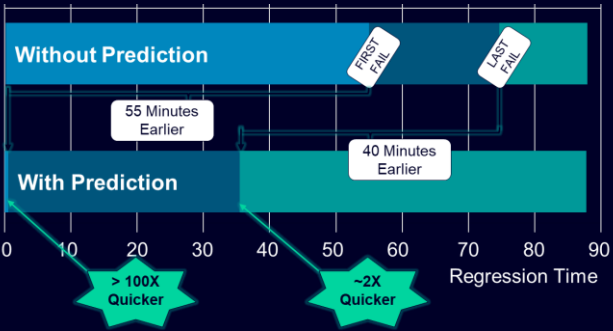
Smoke-test Prediction

Select a sub-set of regression tests affected by design change to accelerate verification of changes

... complete a regression in the minimum amount of time?

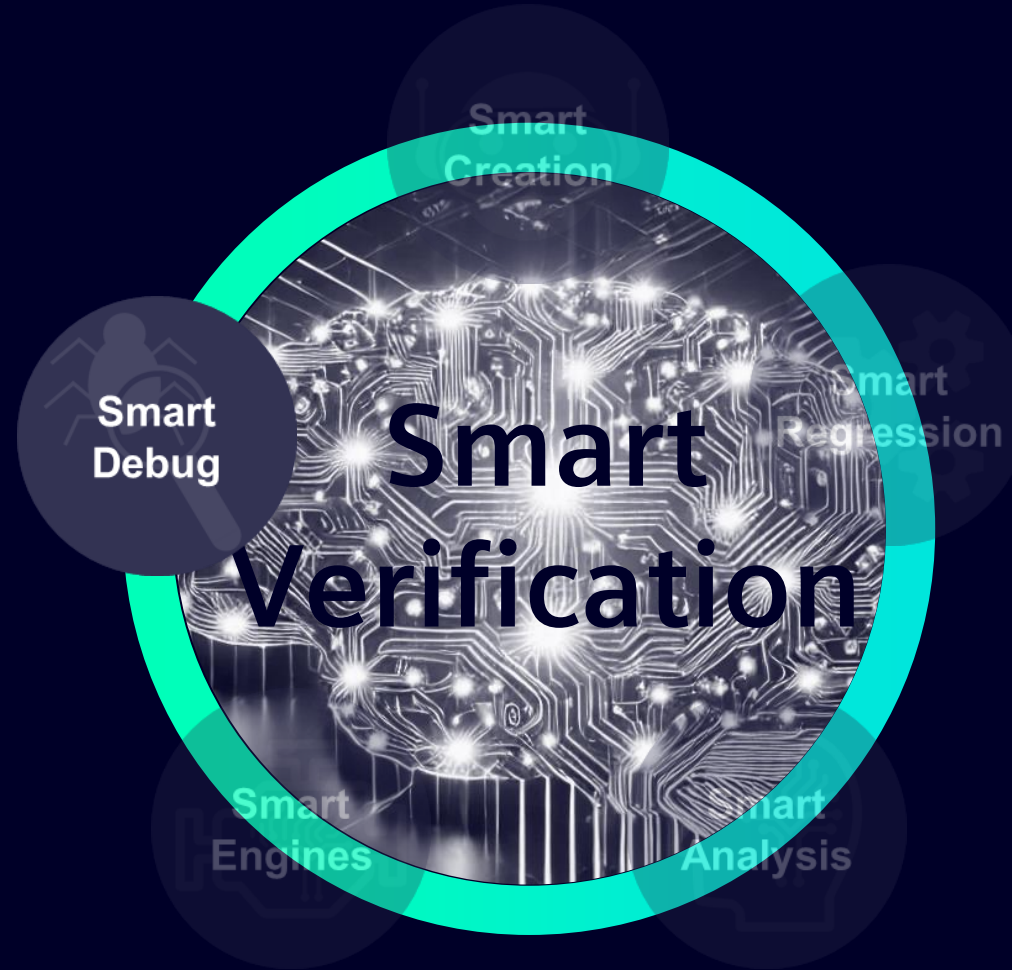
Schedule Prediction

Predict computing demand of regression to optimize resource allocation, with cost or time objectives



Smart Verification

Accelerate Debug Turn-around



Solving Debug Challenges with Smart Debug

How Can AI/ML ...



... quickly find the commit that caused my failure?

Bad Commit Prediction



Predict the commit most likely responsible for failure to accelerate the location of tests to jumpstart debug



... accelerate and automate failure bucketing?

Signature Prediction



Automatic failure signature bucketing to reduce TAT and start root cause analysis sooner



... pinpoint the location or signal causing failure?

Root Cause Prediction



Automatic location of scopes & signals most likely to cause failure to reduce TAT and start debug sooner

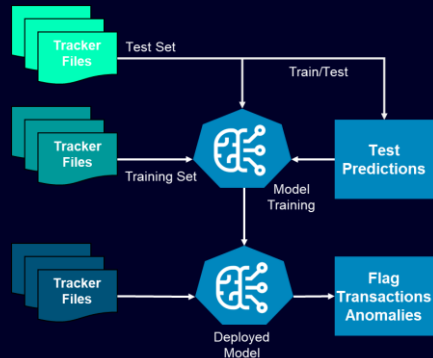
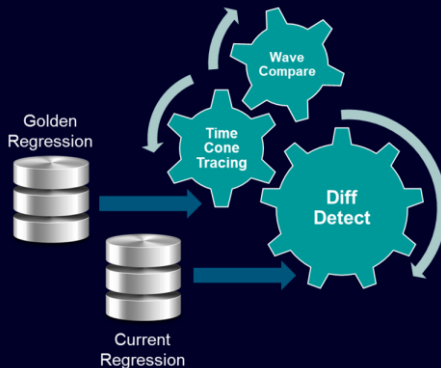
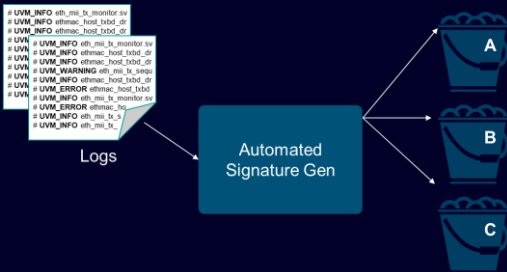
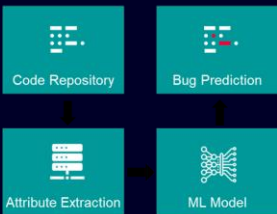
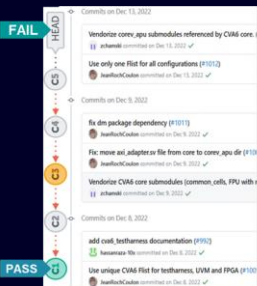


... accelerate transaction debug of protocols ?

Protocol Analysis



Automate transaction detection of protocol anomalies accelerating Protocol Compliance



Optimize Regression Cycles & Accelerate Turn-Around Times

VIQ **Regression Navigator** Provides Intelligent Regression & Debug



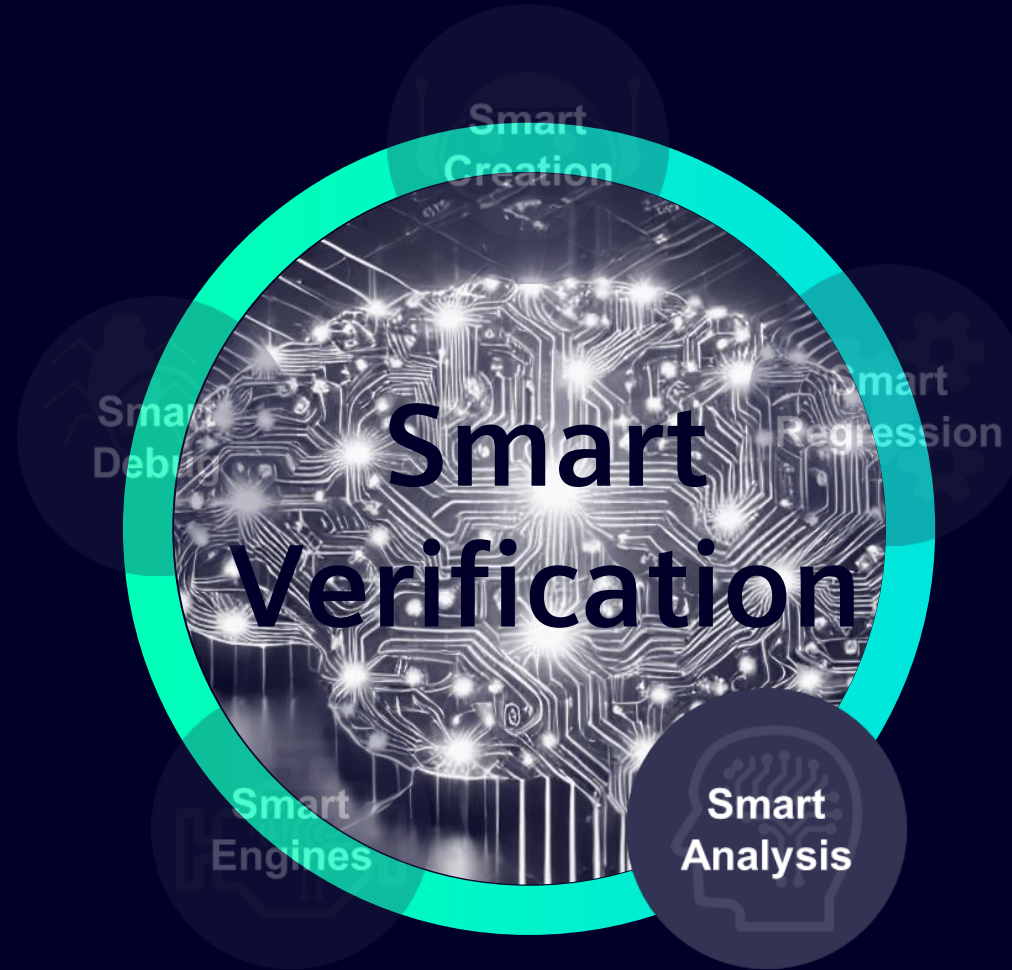
Smart Debug & Regression

Faster Engineers, Fewer Workloads with Regression Navigator

Predictive AI

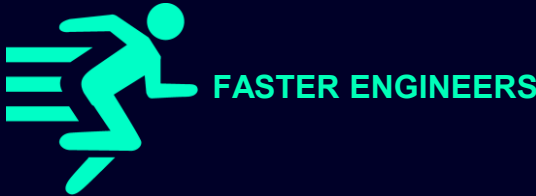
Smart Verification

Accelerate Verification Analysis



Solving Analysis Challenges with Smart Analysis

How Can AI/ML ...



... accelerate expression pattern closure?

Pattern Analysis

Automatically extract common expressions to accelerate stimulus gen or pattern exclusion

... accelerate cross hole coverage closure?

Cross Hole Analysis

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

... group common crossing issues & configure tool?

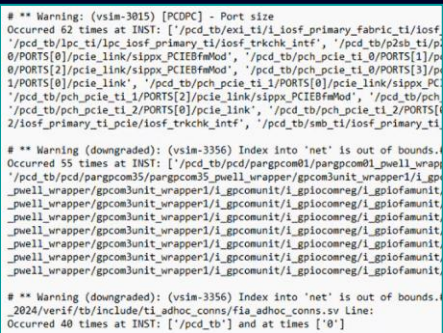
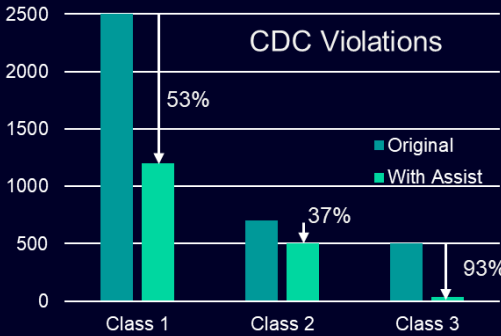
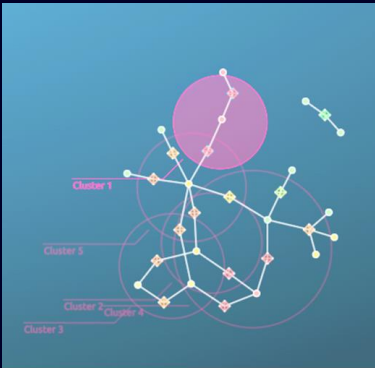
CDC/RDC Assist

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

... accelerate the understanding of log output ?

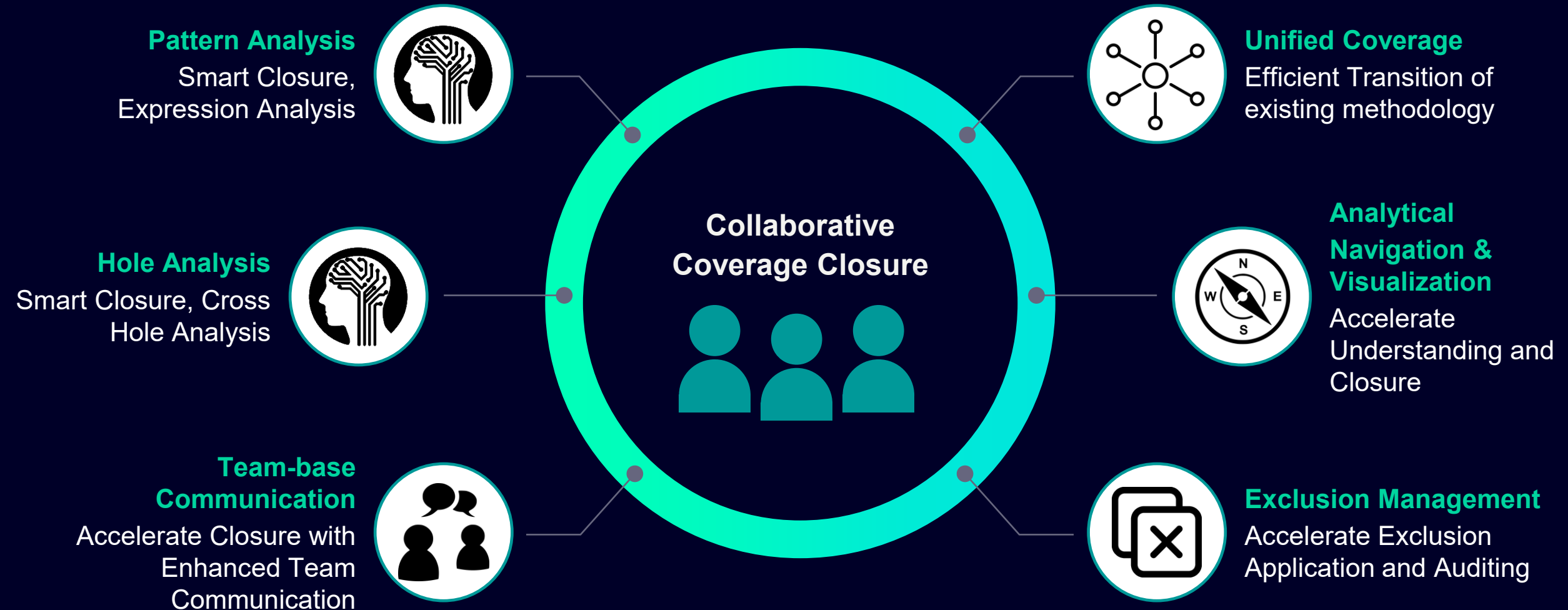
Log Message Clustering

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



Accelerate Coverage Closure

VIQ Coverage Analyzer Provides Intelligent Closure



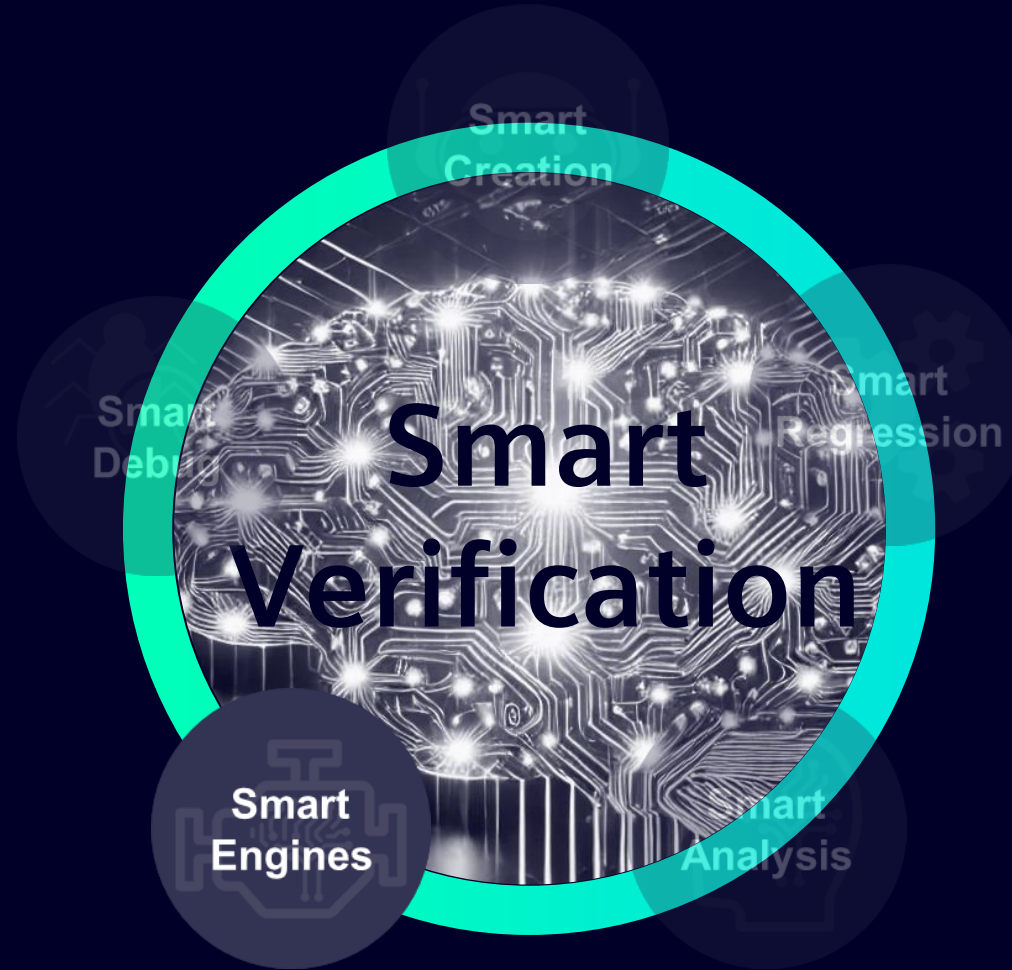
Smart Analysis

Faster Engineers with Coverage Analyzer

Analytical AI

Smart Verification

Accelerate Verification Engines

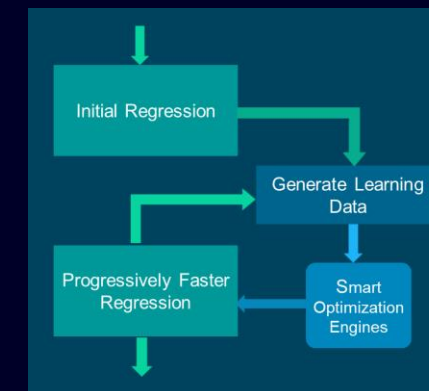
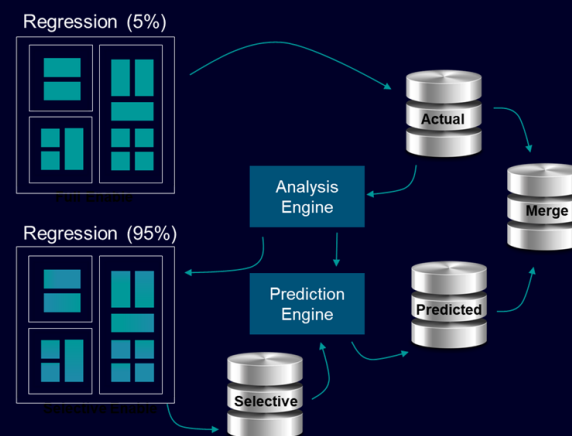
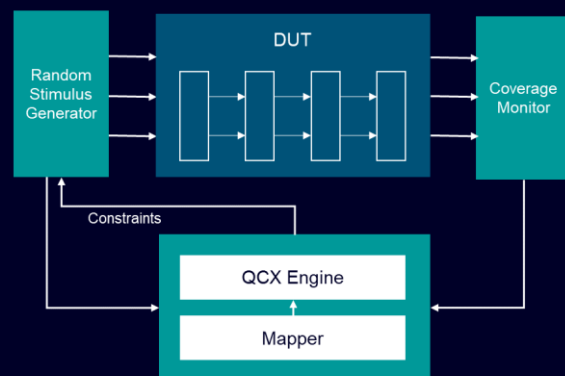
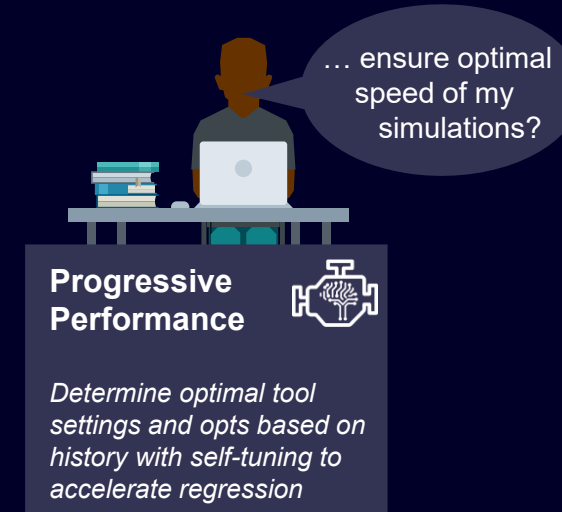
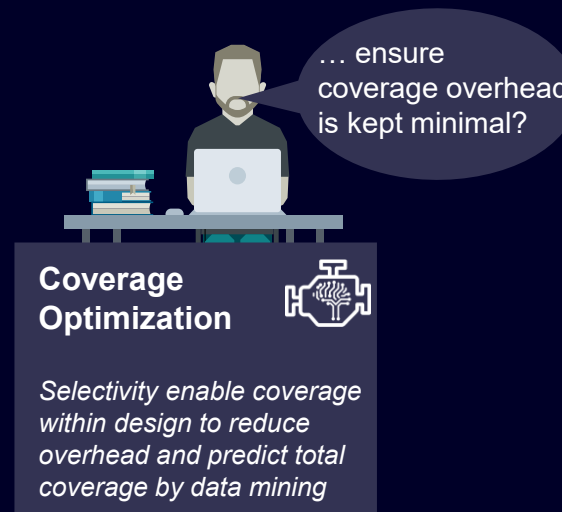
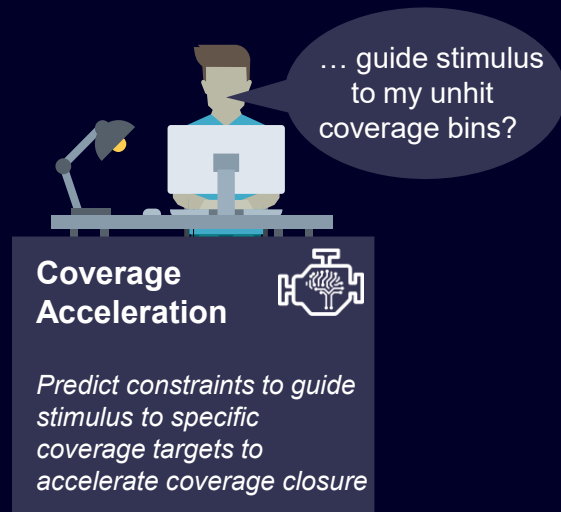


Accelerate Engines with Smart Engines

How Can AI/ML ...



FASTER ENGINES



AI Maximising Verification Productivity

Faster Engines, Faster Engineers and Fewer Workloads

Smart Debug
Intelligent Root-cause
VIQ Regression Navigator

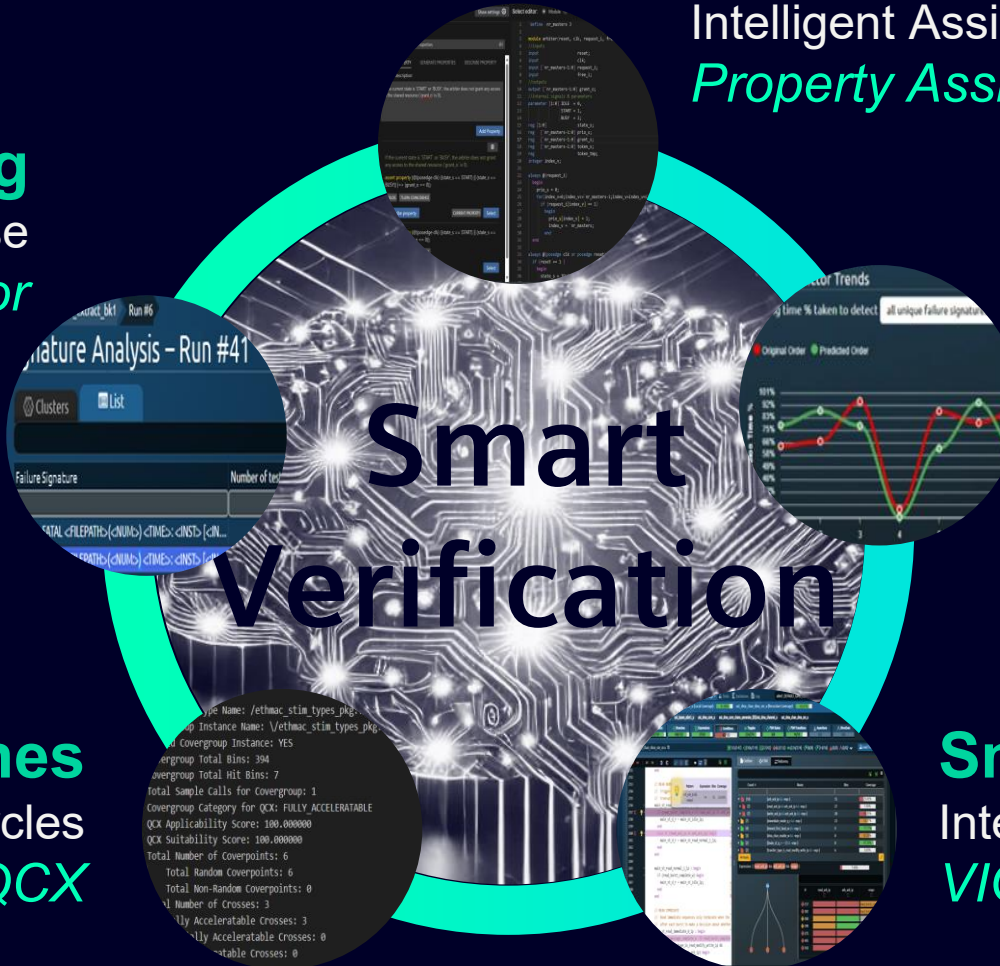
Smart Creation
Intelligent Assistance
Property Assist

Smart Regression
Optimized Regression Cycles
VIQ Regression Navigator

Smart Analysis
Intelligent Insights
VIQ Coverage Analyzer

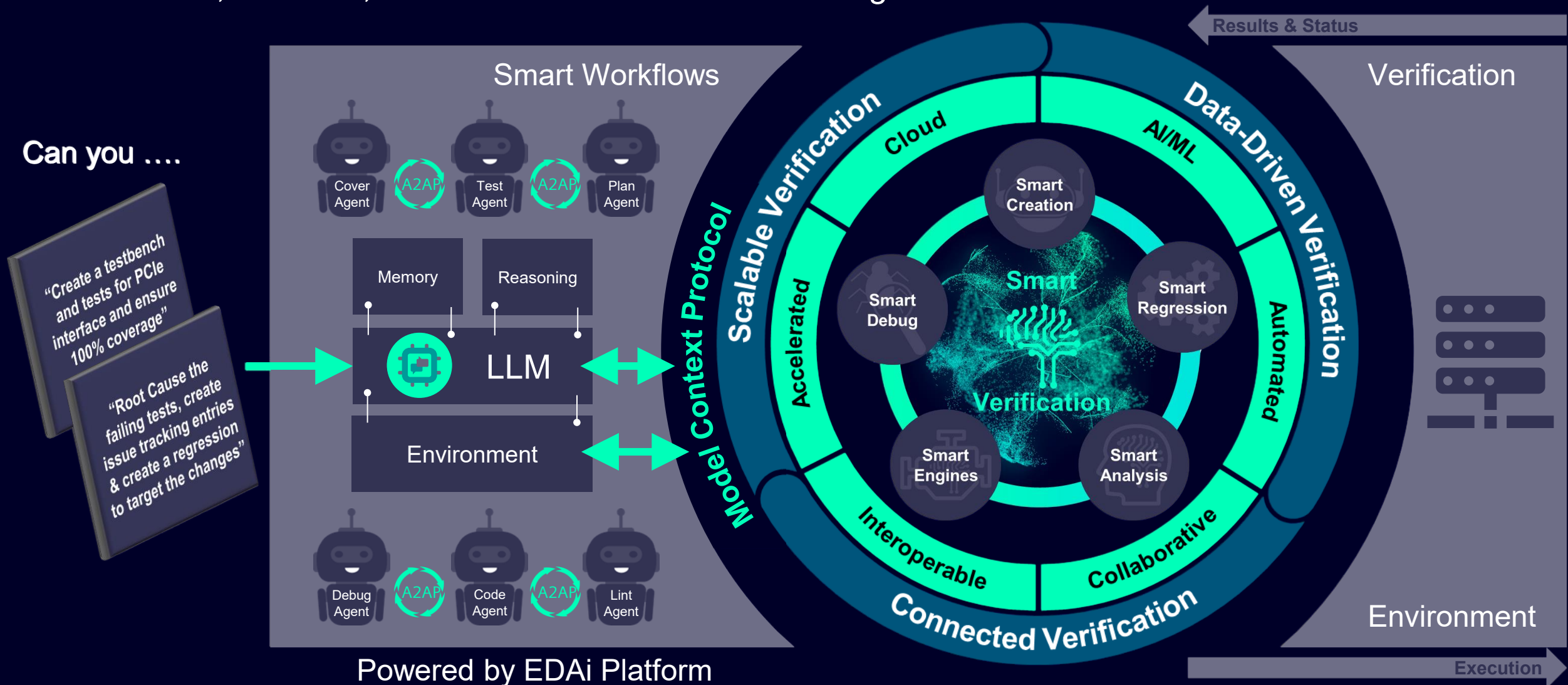
Smart Engines
Intelligent Verification Cycles
QCX

**Smart
Verification**



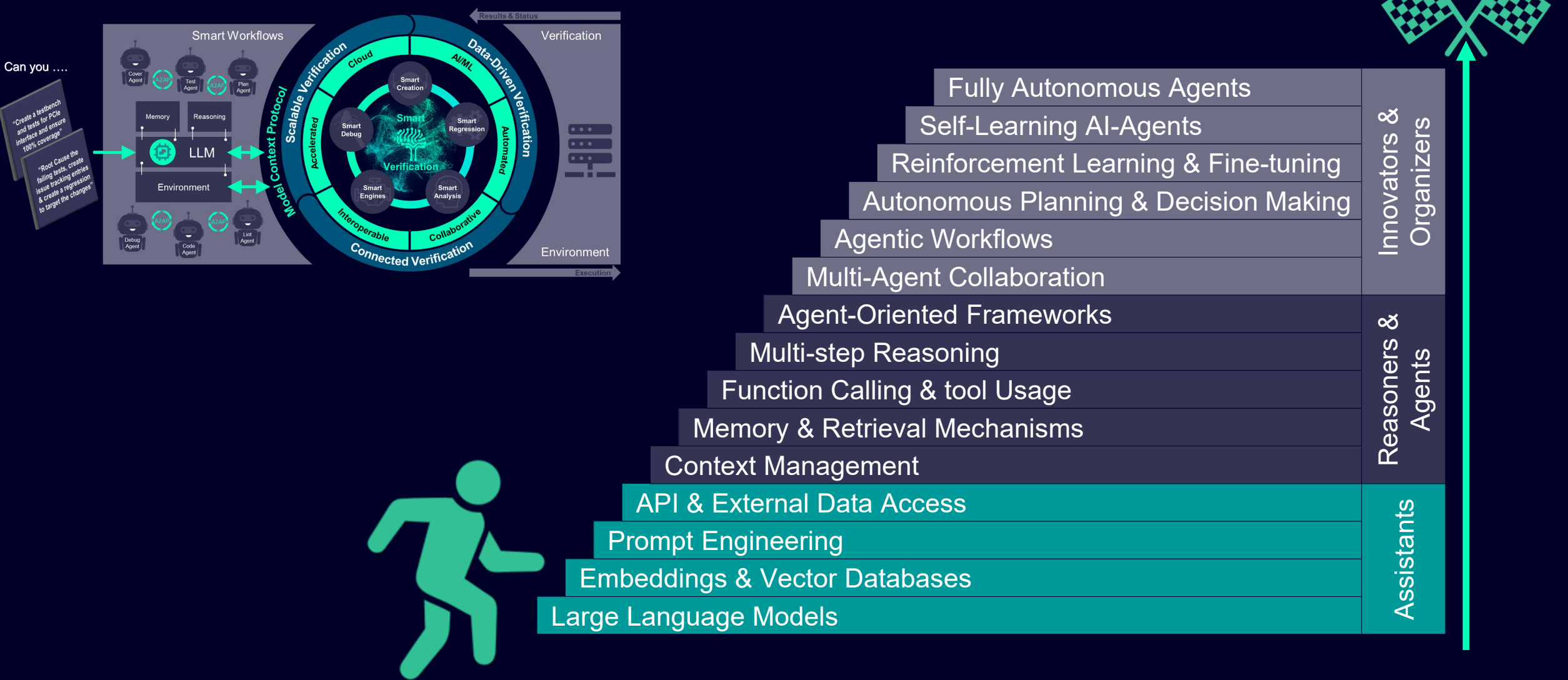
Expansion to Agentic AI Assisted Verification Workflows

Connected, Scalable, Data-driven Verification Technologies



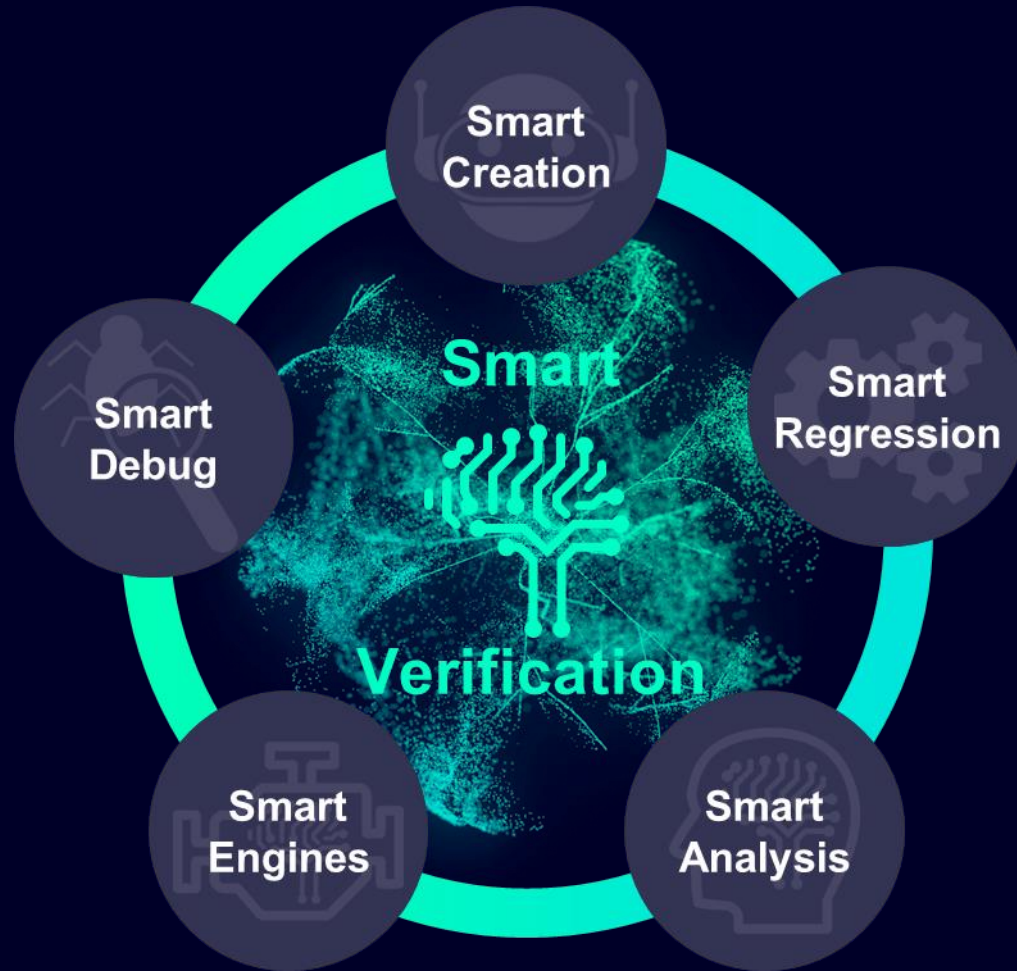
AI Assistants Just the Start

Smart Verification Staircase to Fully Autonomous Agents



Questa™ One Smart Verification

Transforming Functional Verification powered by AI



Faster Engines



Faster Engineers



Fewer Workloads

Contact

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