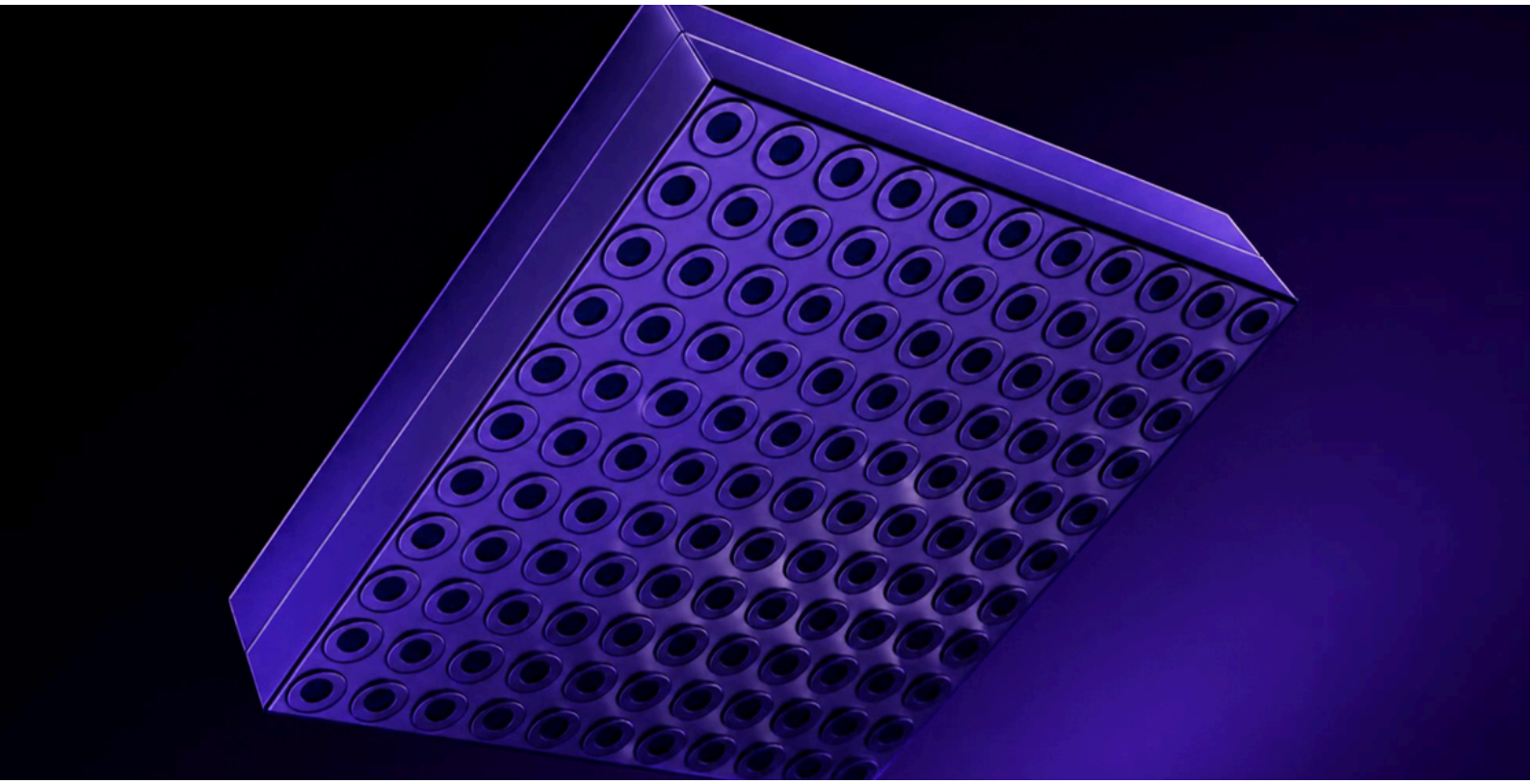
QUANSCIENT



Quanscient Webinar 24th September 2026 | PDF summary

Multiphysics simulation from plain-language prompts

See 5 examples of how Allsolve Agent turns plain-language prompts into real, validated multiphysics simulations.

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Overview

This launch webinar introduced Allsolve Agent, Quanscient's new agentic AI engineering assistant built directly into the Quanscient Allsolve, multiphysics simulation platform.

We began with the big picture: why AI has transformed software engineering but not yet hardware engineering, and how Quanscient proposes to move simulation from validation ("this is my design, how would it work?") to exploration ("these are my specifications, what are the optimal designs?") through a four-step workflow of large-scale simulation, surrogate model training, fast design exploration and deterministic validation, all orchestrated by agentic AI.

We then demonstrated Allsolve Agent live. Starting from short prompts, the agent searched the documentation, found tutorial projects and reproduced them end to end: creating variables, geometry, regions, materials, physics, mesh and outputs, running the simulations, recovering from solver and meshing errors on its own, and producing plots and visualizations. The demos covered a single PMUT cell, a composite tutorial and an 11×11 PMUT array with custom extrapolation scripting and an FFT-based transmit sensitivity analysis. We also showed how an external coding agent can drive the platform through the Allsolve SDK.

Finally, we covered security and privacy, the planned pricing tiers, the short-term roadmap (background work, tool allow lists, multi-project chats, context management, specialized modes, multi-agent workflows and a skill library), and answered a wide range of questions from the audience.

About the speakers



Asser Lähdemäki

Chief Product Officer and Co-founder, Quanscient

Asser Lähdemäki is the Chief Product Officer and co-founder of Quanscient. In this webinar he presented Allsolve Agent and ran all live demonstrations.



Juha Riippi

CEO and Co-founder, Quanscient

Juha Riippi is the CEO and co-founder of Quanscient and a software engineer by background. He hosted the webinar, introduced the big picture and moderated the Q&A.

From validation to exploration

Introduction to Quanscient Allsolve

The cloud- and AI-based multiphysics simulation platform Quanscient Allsolve was used for all demonstrations featured in the webinar.

- A cloud- and AI-based multiphysics simulation platform with a finite element method (FEM) multiphysics solver
- Already used by companies such as kiutra, Infineon, Azbil and Imec to solve some of their hardest engineering simulation problems
- Runs on AWS, which provides the compute capacity and cloud environment used as the product's infrastructure
- Simulation models can be defined purely in code, which makes the platform a natural fit for agentic AI

Why hardware engineering still looks like 2019

AI has completely transformed software engineering: in many places, code is no longer written by hand. In hardware engineering, however, things still look much as they did in 2019. The typical workflow is to design something, run a handful of simulations to validate it, and iterate until the design matches the specification. As a result, only a tiny fraction of the design space ever gets explored.

A four-step workflow for broader design exploration

Quanscient proposes a different workflow, in which every step can be controlled by agentic AI:

01
Simulate at scale
Instead of a handful of simulations, run thousands to generate a large dataset of synthetic physics simulation data.

02
Train surrogate models
Use that data to train AI surrogate models.

03
Explore
Use the surrogate models to explore up to millions of designs extremely fast.

04
Validate
Return to deterministic numerical simulation to validate the chosen designs.

The webinar focused on the agentic AI part: building simulation models by prompting, and a glimpse of the SDK that enables orchestration of the entire process.

The three foundational pillars

1. Scalable simulation infrastructure

A lot of compute is needed to generate the datasets; AWS provides this.

2. Programmatic control

AI will not be clicking buttons in a graphical user interface, but it is excellent at writing scripts and code. Because Allsolve models can be defined purely in code, agentic AI is excellent at running and orchestrating simulation workflows on it.

3. Multiphysics AI

The ability to train surrogate models from simulation data (not covered in depth in this webinar).

Together, these technologies enable the shift from validation (this is my design, how would it work?) to exploration (these are my specifications, what are the optimal designs?).

Allsolve Agent overview

Allsolve Agent is built into the Allsolve platform with a toolset that gives it agentic control of the platform. It can set up simulations and debug them together with the user. Its core capabilities include:

- **Guidance:** it has general knowledge of how the platform works and can search the documentation to answer questions.
- **Project checking:** it is very good at spotting small mistakes such as typos, extra zeros or wrong minus signs.
- **Project setup:** it excels at kicking off a project and handling tedious, repetitive setup work.
- **Open-ended tasks:** beyond the basics, it can take on a wide range of tasks; it will not do everything, but it can do many things.

Users can see the agent's intermediate reasoning while it works. Tool calls can be auto-accepted, or auto-accept can be turned off so that each proposed action must be accepted or rejected; users may want to be more careful when working on an existing project. Several agents can run in parallel in separate projects, and a notification appears when one of them needs attention.

Live demos

Demo 1: Driving Allsolve from an external coding agent via the SDK

The first demo showed that the Allsolve SDK is very compatible with agentic AI tools already used in-house. In a Cursor session, the coding agent was given information about the Allsolve SDK, prepared credentials and a link to the documentation, and was asked to reproduce a demo on Quanscient's testing site.

Because execution is not instant, a previously generated version was shown: the agent had found the demo in the documentation and generated a YAML description of the project. Opening the project in the Allsolve UI showed that it had also run the simulation and produced plots.

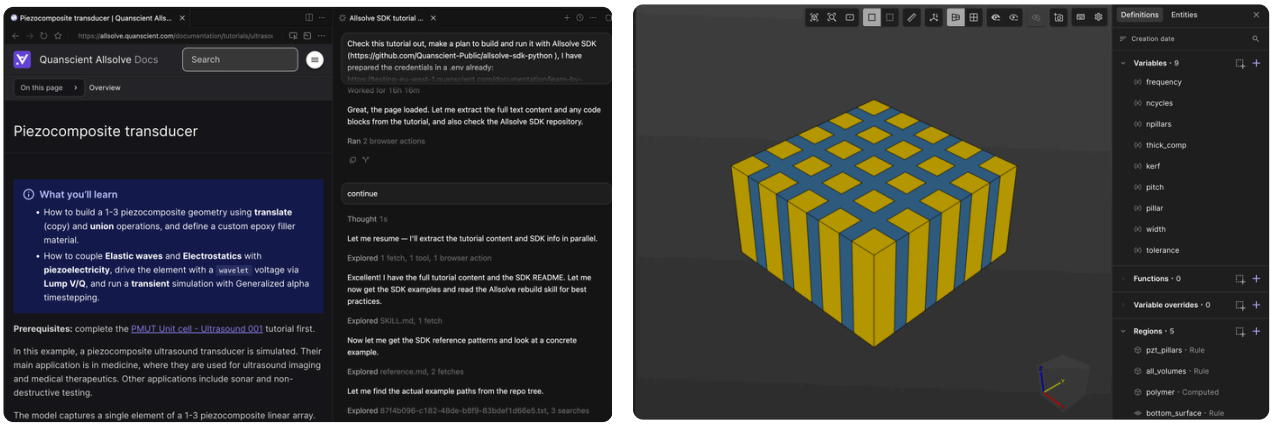


Figure 1 · An external coding agent builds and runs an Allsolve project through the SDK.

Demo 2: The built-in agent reproducing tutorials (single PMUT cell and composite)

Using the built-in agent, a prompt asked it to find the PMUT single-cell tutorial and make a plan to reproduce it. The agent searched the documentation, then created the variables, geometry, regions, materials and physics. The single PMUT cell is a multiphysics problem combining elastic waves, acoustic waves and electrostatics. The agent created the mesh, the simulation and outputs.

Mesh extrusion is not yet available as an agent tool (it is coming soon), so the agent gave instructions for setting it up in the GUI, which produced an extruded mesh in the thin layers at the bottom of the structure.

Live demos

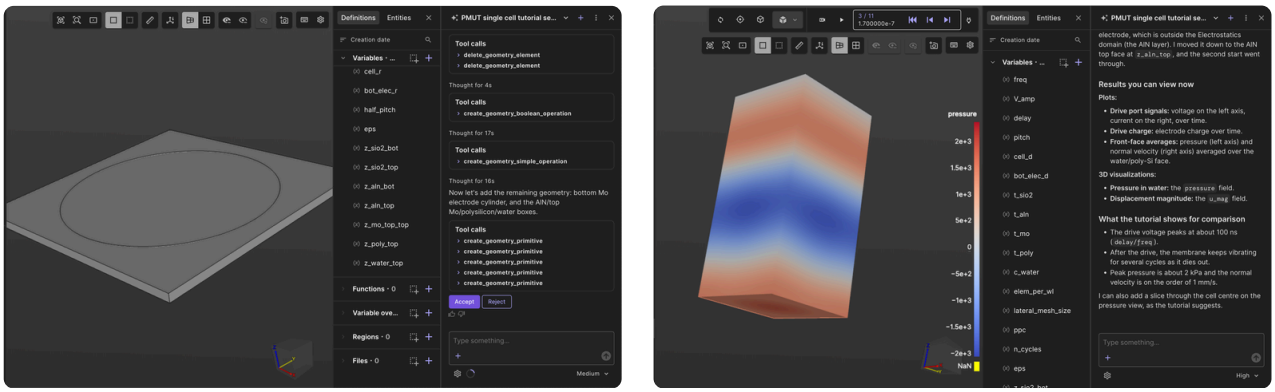


Figure 2 · Allsolve Agent with tool-call approval (left) and the solved single PMUT cell (right).

When the first run failed, the agent read the error from the tool call, fixed the region definition and restarted the simulation on its own. The simulation then succeeded; the agent inspected the available outputs, created plots (drive voltage and current, drive charge, phase averages) and visualizations (pressure wave propagating in water and displacement of the element), and reported what it had done. The drive current and voltage matched the values in the documentation.

Demo 3: An 11×11 PMUT array with custom scripting

To demonstrate time savings on larger setups, the agent was asked to reproduce the PMUT 11×11 array tutorial. It immediately started building the project, including more than 30 variables that would be tedious to type in by hand, the array geometry with cavities, materials (confirmed visually from the colors) and physics. Mesh extrusion was again added through the GUI (seven layers, three sub-layers for each thin layer and one for each other layer).

In parallel, a second agent in another project found the composite tutorial, presented its plan, and was asked to build the whole project, run the simulation and produce plots and visualizations. Meanwhile, the agent was also used to answer a generic documentation question, giving a good overview of the meshing options available in Allsolve.

Live demos

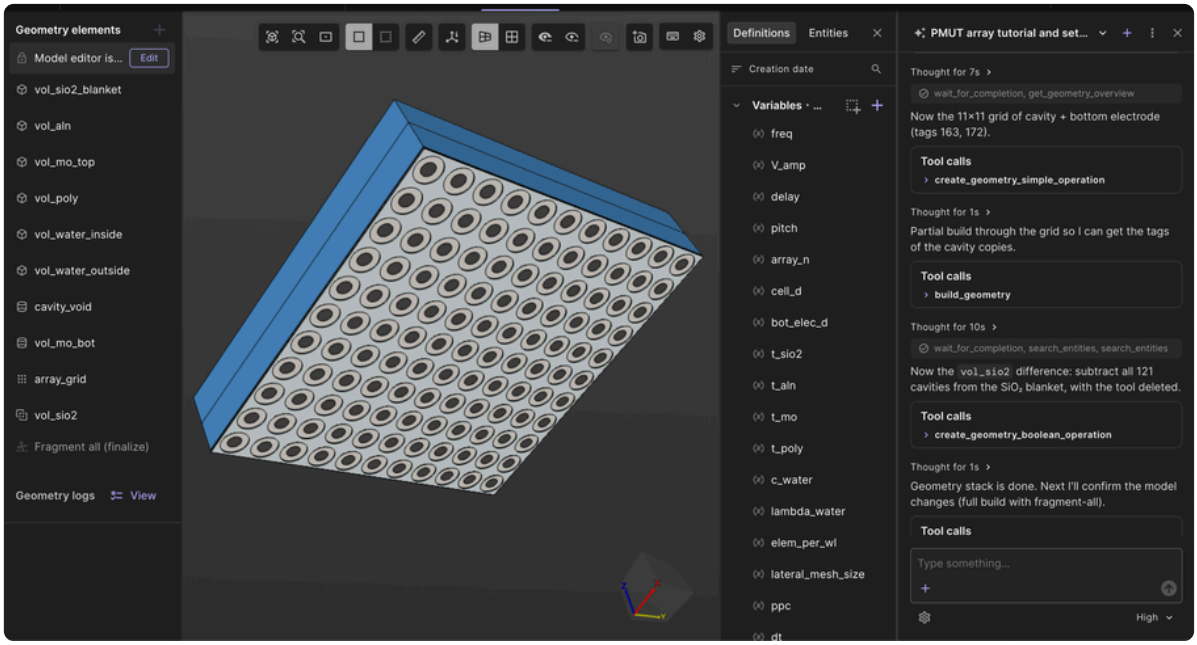


Figure 3 · 11×11 PMUT array geometry generated by the agent.

A meshing error occurred: the mesher ran out of memory because refinement was enabled. The agent checked the mesh logs with an internal tool and turned refinement off, which is acceptable here because the extrusion handles the small details.

This tutorial also requires custom scripting for the extrapolation operations (full GUI support for these is in the works). The agent added the custom sections to the generated simulation script. It initially inserted the replacement time-stepper code after the solve section inside the time-stepper loop; with a small hint, it recognised the mistake and moved the code to the correct place, illustrating how the user and the agent debug together.

Using a previously solved version of the same project, the results were shown: the beam pattern calculated with extrapolation at 50 mm from the device, a polar plot of it, on-axis pressure at 50 mm, and transmit sensitivity and impedance against frequency. Because this was a transient simulation, an FFT was required; the agent wrote the complete FFT post-processing code using NumPy and plotted the results, which show a sensitivity peak around 13.8 MHz for this array.

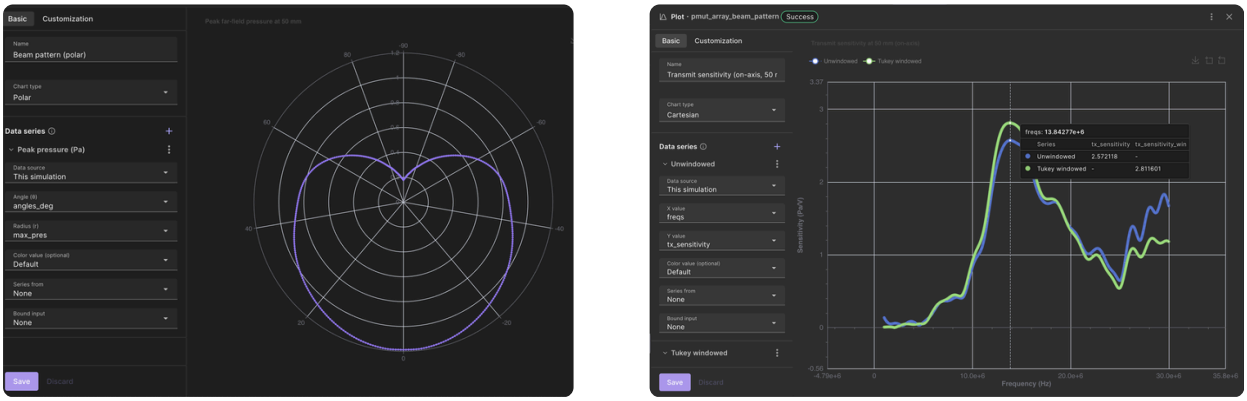


Figure 4 · Beam pattern at 50 mm (left) and FFT-based transmit sensitivity (right).

Live demos

Additional capabilities shown during the session

- **Debugging with images:** enabling screenshots in the visualization sends a screenshot to the agent, or any screenshot can be pasted into the chat with a question such as "does this look correct?". The agent can see the project setup to reason about boundary conditions, read the logs to check convergence, and read solver errors. In one case, this was used to catch wrongly set boundary conditions in a laminar-flow demonstration.
- **Geometry from a prompt:** asked for a "gyroscope", the agent produced a valid mechanical gyroscope, though not a MEMS one; asked more specifically for a "MEMS gyroscope", it created a fairly generic but reasonable geometry, which was then used for the actual simulation. This is not a typical design flow (most users import a geometry), but it shows the agent understands geometries and can be useful for quick idea tests.
- **File input:** the agent accepts PDF and image uploads in addition to text.

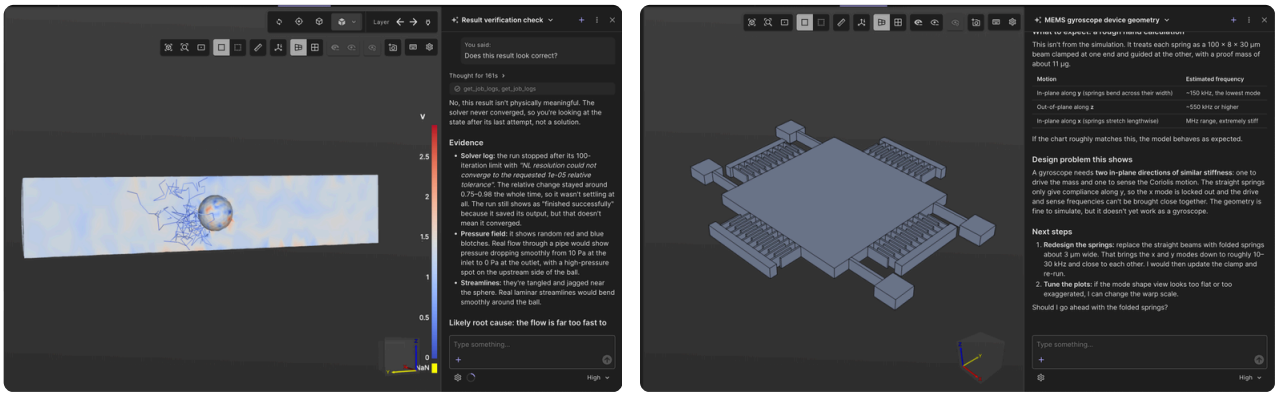


Figure 5 · Debugging with screenshots (left) and geometry from a prompt (right).

Security and privacy

- Chats and user data stay within the cloud provider (AWS); data is not sent outside AWS data centers and data residency is retained.
- The LLM is configured with no data retention for the model providers and no training permissions.
- On the regular plan, chats are not used for training. Quanscient may ask for permission to use them for debugging or improvement at some point.
- Frontier models are used (no local agents or open-weight models for now, although these are being looked into), running inside AWS rather than in the providers' own data centers, with a contractual promise that data will not leave AWS.

Pricing

Three tiers are planned:

Free tier

Limited to asking for help and searching the documentation.

Daily quota per user

Bound to the organization's Allsolve plan, similar to how the maximum number of parallel cores is bound to the plan.

On-demand usage

Users can be allowed to spend organization or team credits to continue using the agent beyond the quota.

Roadmap: what's next

- **True background work:** agents already run in the background, but the browser window must stay open; the goal is to let users leave tasks running and come back later or receive a notification.
- **Better tool control:** user-defined allow lists of which tools are auto-accepted and which are not.
- **Multiple projects in one chat:** currently one project per chat; project creation and management via the agent will follow.
- Agent access everywhere in the application and more granular context management, for example exposing only the geometry or only the variables instead of the whole project.
- Specialized modes for certain tasks.
- Multi-agent / sub-agent workflows for more complex building strategies.
- **Skills and a skill library:** reusable skills for repeatable processes, shareable within an organization (similar to the organization material library) or kept private as user skills.
- **MCP server (future possibility):** exposing the same tools the built-in agent uses to external agents; today this integration is done through the SDK.

Questions and answers

Can Allsolve run explicit dynamic simulations?
Not at the moment; the current FEM solver is implicit. An explicit solver is being explored for long-range problems. Today, an extrapolation functionality is available for acoustics; GUI support for electromagnetics is coming, and Asser believed it already works for electromagnetics in scripting.

Is the agent a wrapper around the Allsolve interface, and can other tools be integrated?
Yes, the built-in agent is a wrapper designed to understand the Allsolve platform. Integration with other tools is done through the SDK, with skill files provided, and any agentic AI that can write Python can use it. Users have built custom GUIs on top of the platform and integrations to parametric CAD tools for geometric sweeps and design exploration. An MCP server is a possible future addition.

Questions and answers

Can simulation results feed new geometries or material parameters computed externally?
If the external tool (for example a third-party CAD engine) offers programmatic access, this should be very possible, although it depends on the design software in use. Allsolve's own geometry builder is a reduced set compared with full CAD software but is flexible for many use cases. Generative-AI-based geometry generation is not offered today.

If a simulation diverges, can the agent tell whether the cause is numerical or physical and suggest fixes?
Yes. The agent can see the project setup (to reason about boundary conditions), the logs (to check convergence) and solver errors, and it accepts screenshots of results for review.

Can repeatable processes be automated so the same prompts need not be repeated?
Not yet, but it is planned through the skill library (organization-shared and user-private skills).

Can external toolchains (for example a geophysical simulation library used with Claude) be exposed?
This would be covered by the SDK as an extra toolchain; Quanscient will follow up with more detail.

Can the agent create its own geometries from boundary conditions and specifications?
Very likely: given a specification it can create a geometry, and it is also good at suggesting a simulation analysis for an imported geometry. The feature is new and not everything has been tested yet. Geometric and topology optimization are being addressed with multiphysics AI surrogate-model-based technologies, where agentic AI could also contribute.

Which solver is used: PINNs or quantum-inspired algorithms?
Neither. The main solver is an implicit finite element method solver; an explicit solver and a lattice Boltzmann solver for high-speed turbulent CFD are in development. Separately, AI/ML-based surrogate models trained from FEM results are being integrated for fast inference.

Does the agent test the physics (for example mesh or numerical checks)?
There are no automated physics tests yet. Because the weak formulation can be given freely in the script, the agent has written custom formulations, and it can be asked to run, for example, a mesh convergence study with different meshes.

Can acoustic speakers or microphones be simulated?
Yes; there are examples on the speaker side, piezo microphones are a good area, and acoustics in general is a strong area for Allsolve.

What level of TCAD for microelectronics is possible?
Manufacturing processes are not modeled within Allsolve, but partners can integrate with it via the SDK; contact Quanscient for details.

Which LLMs are used under the hood?
Frontier models running inside AWS, with contractual guarantees that data does not leave AWS; local and open-weight models are being looked into.

Is input limited to text?
No; PDFs and images can also be uploaded.

Key takeaways

- **Prompt-to-simulation:** Allsolve Agent can take a short prompt, find the relevant tutorial or documentation, and build a complete multiphysics project (variables, geometry, regions, materials, physics, mesh, outputs), run it and produce plots and visualizations.
- **Time savings on tedious setup:** tasks like entering 30+ variables, building array geometries or writing FFT post-processing code are handled by the agent.
- **Secure by design:** data and chats stay within AWS, with no provider retention or training, and chats are not used for training on the regular plan.
- **Self-correcting:** the agent reads tool-call feedback, logs and solver errors, fixes problems such as region definitions or memory-hungry mesh refinement, and reruns, with the user stepping in only when needed.
- **Code-defined models make agents effective:** because Allsolve models are defined in code, both the built-in agent and external agents (via the SDK) can orchestrate full simulation workflows.
- **Rapidly evolving:** background execution, tool allow lists, multi-project chats, finer context control, specialized modes, multi-agent workflows and a skill library are on the near-term roadmap.

Get in touch

Allsolve Agent is being rolled out to all existing Allsolve users within the next few days.

If you would like to try Allsolve Agent and the Allsolve platform yourself, or discuss how agentic AI and the Allsolve SDK could fit your simulation workflows, please get in touch with us.

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