

EON Live

The plant, running.

A product white paper on the real-time physics layer for Work Intelligence — what it is, where it ends and EON Universal begins, and the use cases it unlocks across training, the field, and the office.



Table of Contents

Executive summary.....	2
1. The gap: description versus execution.....	2
2. Three rungs: replay, understand, run.....	3
Genesis — replays it.....	3
EON Universal — understands it.....	3
EON Live — runs it.....	3
3. What EON Live is.....	3
4. The boundary with EON Universal.....	4
5. Use cases.....	4
5.1. In the training centre.....	5
5.2. On the rig and in the field.....	5
5.3. Anywhere and at home.....	5
5.4. New capabilities only live physics unlocks.....	6
6. Cross-domain applicability.....	6
7. A note on fidelity.....	7
Tier one — plausible physics.....	7
Tier two — engineering-grade physics.....	7
8. Where EON Live sits in the Intelligence Flywheel.....	7
9. First deployment: the LOTO skid, live.....	8

Executive summary

EON Live is the real-time physics runtime of the Work Intelligence platform. It takes the component model that EON Universal has already built — the geometry, the named components, how they connect, how they isolate — and executes it as live physics on the Babylon engine. The asset stops merely looking right and starts behaving right: pressure builds and bleeds down, flow follows the piping, a starved pump cavitates, an over-pressured vessel lifts its relief. Consequences emerge from the simulation rather than being written into a script.

This is a deliberate, narrow addition. EON Live does not re-create Universal's understanding — it executes it. Everything Universal already does (recognition, composition, isolation logic, authoring conditional procedures) remains Universal's job. EON Live adds only the layer that requires live, simulated state. That boundary is the most important thing in this paper, and Section 4 draws it explicitly.

The payoff is a step change in what the platform can do. Trainees can operate a unit and be corrected by physics rather than by a script; they can break equipment safely to build intuition; they can rehearse a start-up transient. Field technicians can simulate the next move before they make it. Engineers can test a proposed modification and watch it behave before a pipe is cut. And because the runtime executes typed components rather than a memorised facility, the same engine transfers from oil and gas to mining, power, water and process.

1. The gap: description versus execution

A large language model can describe a valve in exhaustive detail. It can recite the steps of a procedure in the correct order. What it cannot do is run the plant. Follow those steps against a model that only knows the words, and nothing happens: close the wrong valve and the pressure does not rise, the downstream pump does not cavitate, nothing pushes back. The knowledge is real but inert.

That inertness is the line between a recording and a system that behaves. Genesis, at its core, is an excellent recording — **a living, hands-on simulator of a procedure**. EON Universal goes much further by understanding the equipment well enough to reason about it. But **reasoning about a fact and simulating that fact are different things**, and the gap between them is exactly the space EON Live fills.

“Physics doesn’t hallucinate.” Description is cheap and available to everyone. Behaviour is the moat — public AI can talk about a pump, but it cannot integrate the pressure and flow of one specific skid, live.

2. Three rungs: replay, understand, run

The clearest way to place EON Live is on a ladder the platform already climbs. Each rung is defined by what it can do with a single quantity — pressure — as the worked example.

Genesis — replays it

Genesis plays the steps back in order. It is a faithful simulator of the procedure, but it has no concept of pressure at all. Pressure is simply not part of its model.

EON Universal — understands it

Universal knows the components, how they connect and how they isolate. Crucially, it knows the fact that a pump stores pressure after power-off — and because it knows that fact, it can author a conditional procedure that branches on it: “pressure still present? bleed down before opening.” This is a large step beyond Genesis. But the branch is still authored: a person or model wrote the decision tree using the fact.

EON Live — runs it

EON Live executes that same model as live physics. Pressure is no longer a fact to branch on; it is an actual state variable that builds, propagates through the network, and decays over time. It is genuinely present. Open the valve early and a real, simulated release occurs — not because anyone authored that branch, but because the physics produced the consequence. The behaviour emerges, exactly as a capsized ship emerges from wave and hull forces in a well-built sailing simulator rather than from a scripted “you lose” screen.

3. What EON Live is

EON Live is a **real-time physics runtime built on the Babylon game engine**. It consumes the component model EON Universal produces and turns each component's properties into live state — **pressure, flow, torque, temperature** — integrated every frame across the real piping and connectivity graph. A pump contributes its curve; a relief valve its set-point; a line its diameter and resistance. From those typed parts, assembled as Universal already assembles them, a runnable behavioural twin falls out.

The important architectural point is that EON Live reuses what already exists. **There is no second capture and no second model.** The geometry and the components are

Universal's; the engine is Babylon, which the platform already runs. EON Live is the thin, high-value layer that makes the two behave together.

The same understanding, now executed as behaviour you can operate, break, and measure.

4. The boundary with EON Universal

This section exists to prevent a specific confusion. EON Universal is already a deep product: it understands components, relationships and isolation, and it authors conditional procedures on that understanding. **EON Live must not be described as doing any of that.** Live's entire remit is the execution of Universal's model as a live state. If a capability does not require pressure, flow, torque or heat to be simulated over time, it belongs to Universal, not to Live.

EON Universal already owns	EON Live adds (needs live state)
• Recognising and naming every component on sight • Component properties, relationships and connectivity • Isolation logic and boundaries • Composing engineering-valid facilities • Authoring conditional SOPs that branch on a known fact	• Pressure, flow, torque and heat as live state variables • Consequences that emerge unscripted • Real-time transients (start-up, upset, decay) • A telemetry-fed mirror of the running asset • Scoring judgement from the actual state trajectory

Read the table as a hand-off, not a rivalry: the left column is the input EON Live depends on, and the right column is the only thing EON Live adds.

5. Use cases

The platform already delivers to three surfaces — anywhere (phone or AR glasses), on the rig (tablet or AR on the real equipment), and immersive (the CAVE). The same live twin drives all three; only the display changes. The use cases below are organised by where the work happens.

5.1. In the training centre

- **Consequence-based operation** — The trainee operates the unit and the physics decides whether they were right. A wrong sequence produces a real, developing upset — a surge, a cavitating pump, a trip — not a canned “wrong” screen.
- **Break-it-safely sandbox** — Run a pump dry, dead-head it, water-hammer a line, or over-pressure a vessel until the relief lifts. Impossible on live equipment, and priceless for building intuition about where the edge is.
- **Start-up and shutdown transients** — Rehearse the moment where most incidents happen — managing evolving pressure, thermal growth and flow over time — rather than tapping through a fixed list of steps.
- **Emergent scenario generation** — One asset model yields near-infinite scenarios from a fault plus physics, with no hand-authoring, giving AssessIQ a bottomless and varied test bank.
- **Judgement-based assessment** — Because the simulation tracks the full state trajectory, competence can be scored on how a trainee stabilised an upset — reaction, sequence, and secondary problems induced — instead of on a quiz.

5.2. On the rig and in the field

- **Pre-action “what-if”** — Standing at the unit, a technician asks what happens if a valve is closed now, and the twin simulates the consequence — on the real topology — before anyone touches anything.
- **Isolation and LOTO validation** — Because the engine knows connectivity and flow, it can confirm that a proposed isolation genuinely isolates, and surface the sneak path a person might miss. This is sellable as a safety capability in its own right.
- **Live-mirror twin** — Fed real sensor data, the twin tracks the running asset and explains why a reading is what it is — flagging a physics anomaly such as “this gauge reads X, but physics says Y between these points, so suspect a blockage here.”
- **Reactive guidance** — If a technician's action produces an unexpected response, the twin catches it and re-plans — moving FieldIQ from step playback to reacting in real time, like a first mate calling out a bad wave.
- **Release, dispersion and thermal modelling** — A gas cloud, a spreading spill or fire radiation can be modelled on the actual plant layout, for muster-route validation, sensor placement and evacuation drills.

5.3. Anywhere and at home

- **Turnaround and commissioning rehearsal** — The whole crew rehearses the full sequence remotely and multi-user on the behaving twin. Because physics ties

everyone's actions together, coordination failures surface before the event, not just individual mistakes.

- **Test the plan (Management of Change)** — An engineer runs a proposed modification — a new tie-in, an added pump, a re-route — and watches whether it behaves: dead legs, vibration, pressure drop. The plan comes alive before a pipe is cut. Note that this reaches a new buyer in engineering, not only in training.
- **Remote expert in the twin** — A subject-matter expert joins the mirrored simulation, demonstrates the fix inside the simulation, and the field technician executes it for real. Physics keeps the demonstration honest rather than hand-wavy over a phone.

5.4. New capabilities only live physics unlocks

- **The asset explains itself** — Fusing the physics state with a language model, a worker can ask “why did the pressure spike when I did that?” and receive an answer drawn from the running simulation state — not from a manual. It can answer questions nobody wrote an answer to.
- **Derive a procedure** — Given a goal state — “get this vessel safe for entry” — the engine can search the physics and topology to generate a valid, safe sequence for a human to validate. This is procedure generation, not playback.
- **Cheap behaviour authoring at scale** — A frontier model specifies each component's behaviour model once; cheaper routed models then instantiate it across every skid. This is Switchboard economics applied to physics — the behaviour library compounds instead of costing per site.

6. Cross-domain applicability

Because EON Live runs typed components rather than a memorised facility, the **runtime transfers across industries**: swap the component library and the behaviour models, and keep the engine. In **oil and gas it simulates pressure and flow networks**, isolation, relief and dispersion. In **mining it drives ventilation-on-demand through the real tunnel geometry**, dewatering-pump networks under a flooding scenario, conveyor and crusher dynamics, and smoke or gas egress. In **power it handles load flow, transformer thermal behaviour** and switching sequences; in water, hydraulics and dosing; in process and pharmaceuticals, batch reactions and clean-in-place.

This is the platform argument in its strongest form: **not a content library rebuilt per site, but one behavioural runtime that compounds across every industry built from a finite set of components.**

7. A note on fidelity

It is worth being straight about how accurate the physics is, because the honest answer sharpens the roadmap rather than weakening it. There are two tiers, and they serve different purposes.

Tier one — plausible physics

This is the sailing-game class of simulation: **convincing, interactive, real-time, and light** enough to run on a phone. It is more than sufficient to build genuine intuition, and it powers training, familiarisation, field feel and consequence. This tier represents roughly eighty per cent of the value described in this paper, and it is achievable today. It is where the platform should start.

Tier two — engineering-grade physics

Where a quantitative answer is required — design sign-off, Management of Change, a real number rather than a realistic feel — **CFD and thermo-hydraulic accuracy come into play**. In practice this means reduced-order models or coupling to an external solver, not a full process simulator running inside the game engine on day one. This tier should be layered in deliberately, only where the use case demands truth over feel.

8. Where EON Live sits in the Intelligence Flywheel

EON Live is not a fifth product competing with the flywheel; it is the **runtime beneath it**. Genesis, **FieldIQ, AssessIQ, Compound IQ and EON Universal all consume it** — it is what allows each of them to make the asset behave rather than merely describe it. As before, Conductor orchestrates, Verdict gates trust and safety, and Switchboard governs which models are used. **EON Live simply supplies the live behaviour those layers act on.**

9. First deployment: the LOTO skid, live

The most persuasive first build is also the most tractable, because both halves already exist. Take a single skid that is already modelled in the Living Library. Add a minimal fluid network in Babylon — nodes are components, edges are pipes, valve states gate flow, with one pump curve and one relief set-point. Then run the existing lock-out procedure slide, live.

Today that slide branches on an authored “pressure still present?” flag. With EON Live, residual pressure becomes a real, decaying state variable that is genuinely present and bleeding down. Open the valve early and a real, simulated release follows — no branch authored, the consequence emerged. **It is the same slide already presented to major operators, except that it is now behaving rather than branching.** That single before-and-after is the clearest possible demonstration of what EON Live means.

Genesis replays the plant. EON Universal understands it. EON Live runs it.

EON AI Ventures · Work Intelligence · Confidential