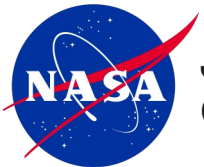


JPL's Integrated Systems Engineering Environment

Maximilian Vierlboeck, Ph.D.
Systems Engineering Environment Lead
and AI Systems Product Owner

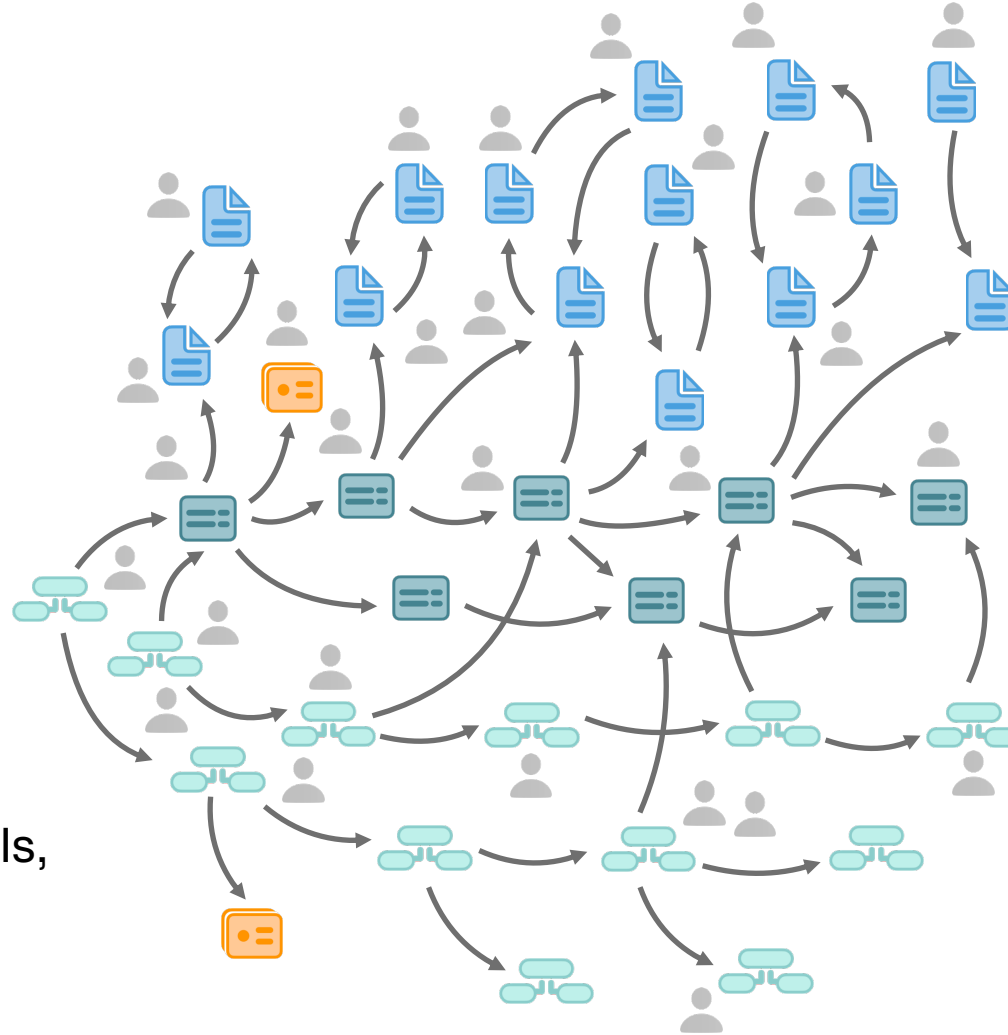
10/08/2026



Jet Propulsion Laboratory
California Institute of Technology



The Problem — Every Handoff Is Lossy



Data scattered across tools,
traceability kept by hand



People are the interface
between tools



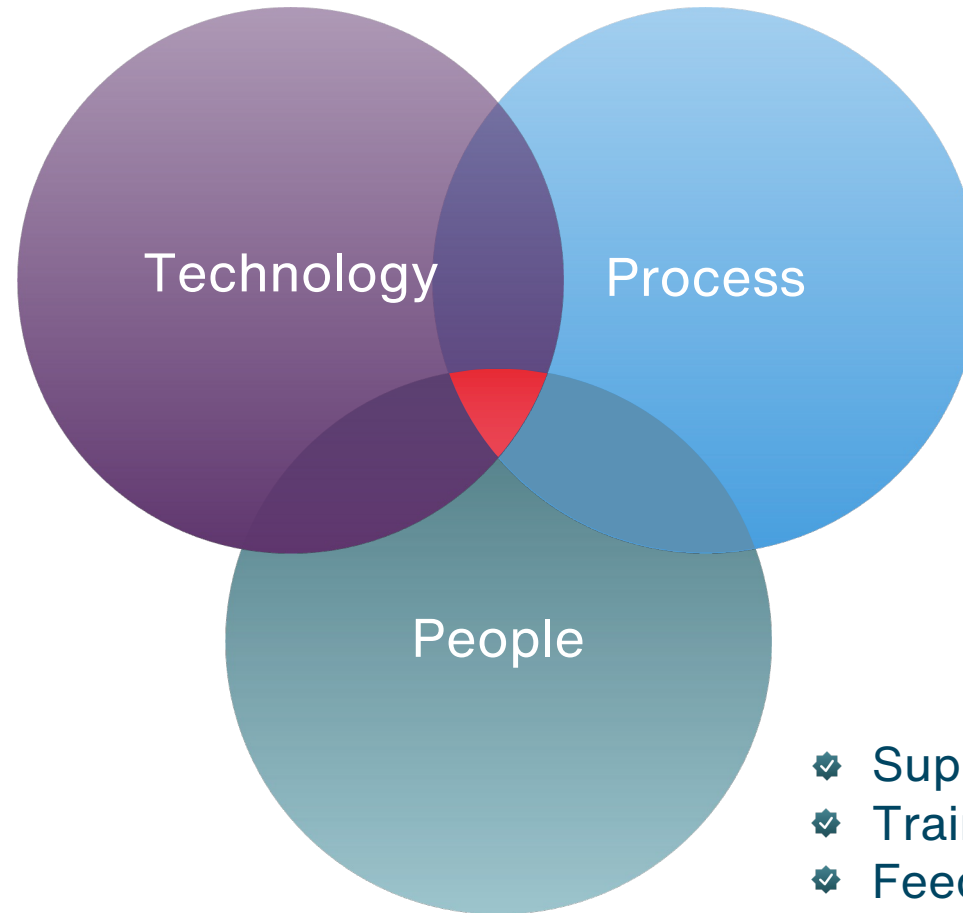
Manual handoffs, drift
found late



Every new tool adds
more handoffs

The Bedrock of Integration

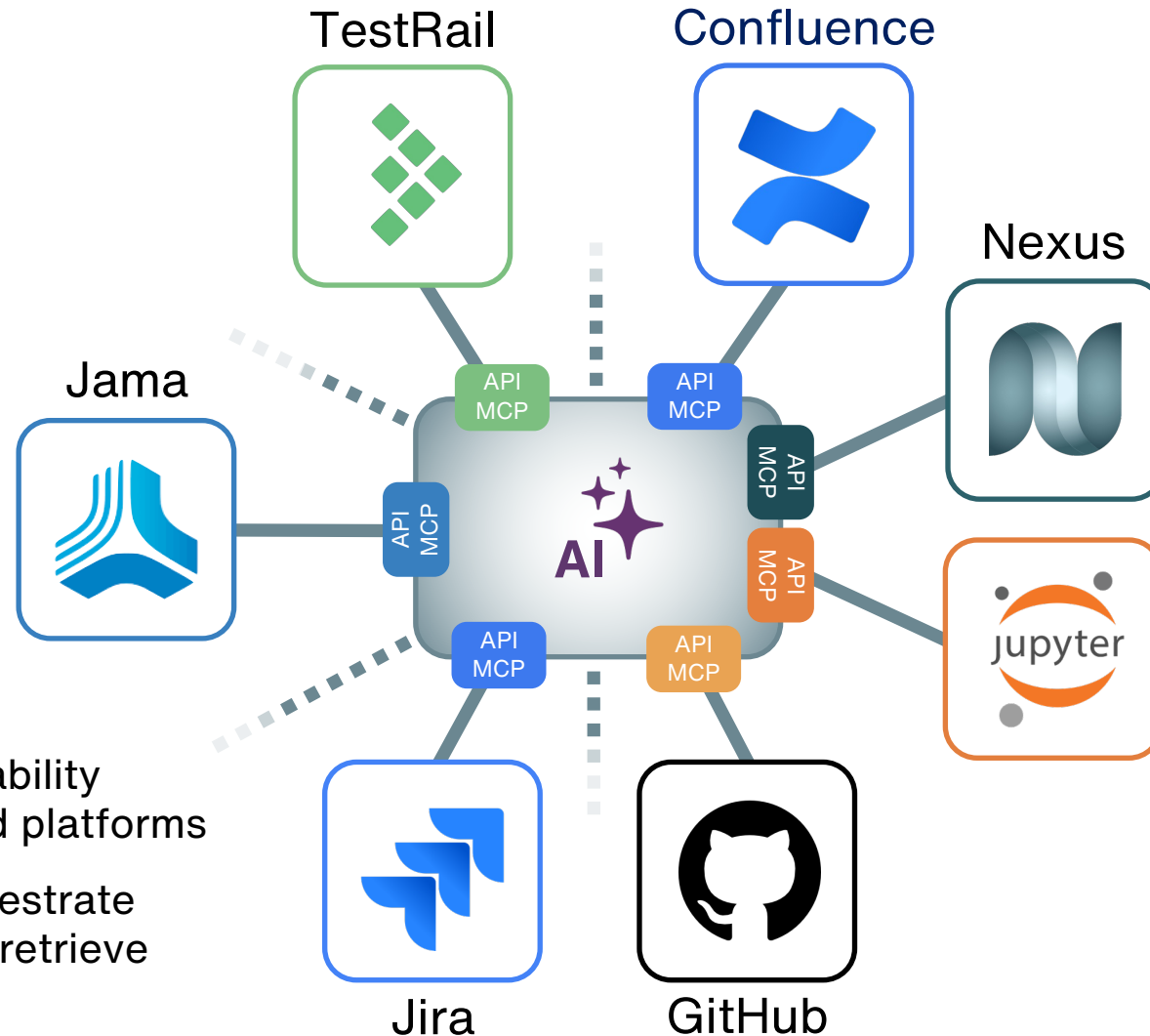
- ✦ Functional Enablement
- ✦ Standardized Architecture
- ✦ Integration/Connection



- ✦ Schemas with Flexibility
- ✦ Integrated Workflows
- ✦ Continuous Release

- ✦ Support and Help
- ✦ Training and Learning
- ✦ Feedback and Inclusion

One Environment, Many Tools



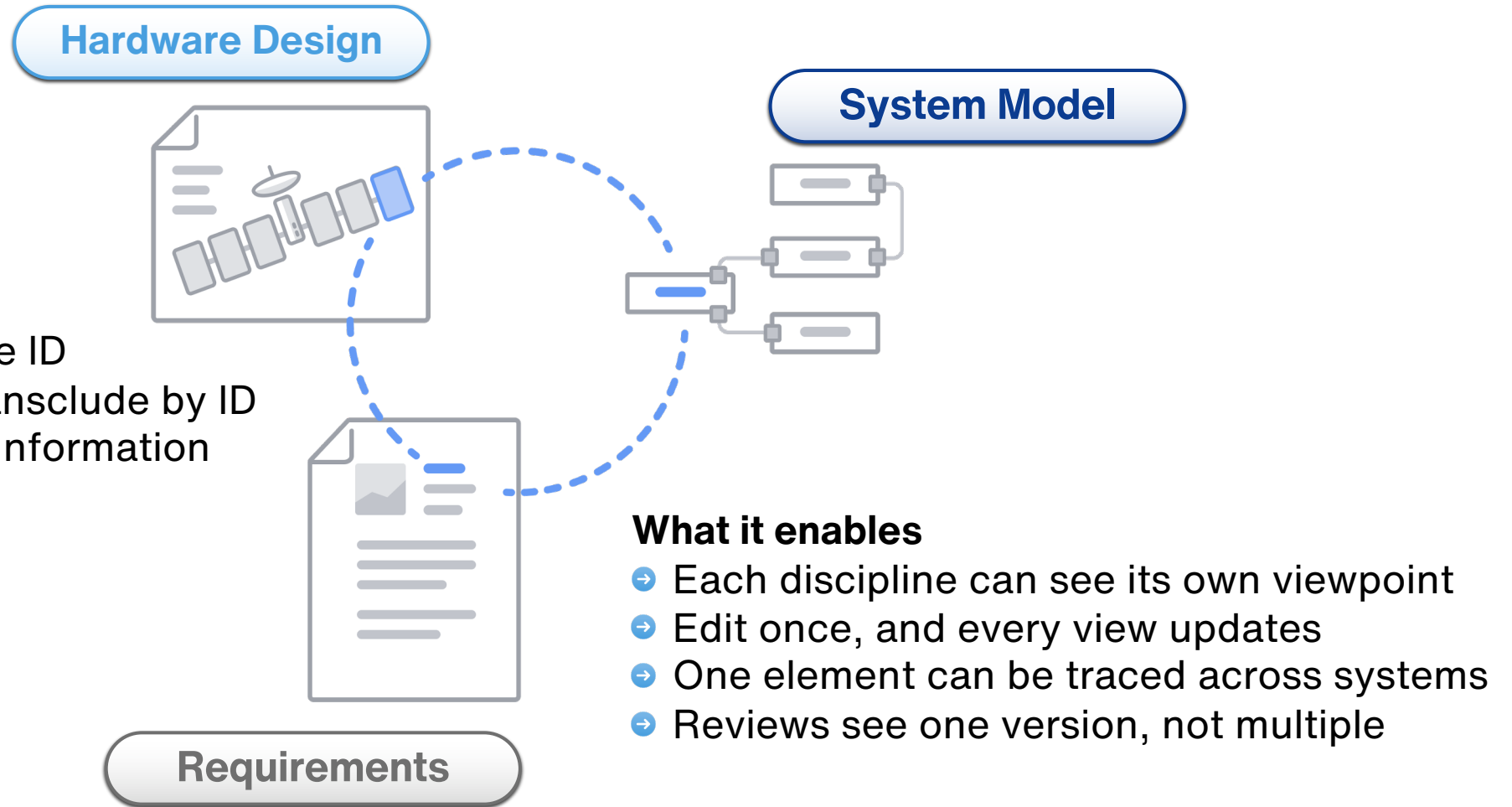
- ✓ Data access and traceability across applications and platforms
- ✓ MCP & APIs let AI orchestrate across tools — not just retrieve from them

- ✓ Full-Scale Automation and Integration
- ✓ Tool Agnosticism + Expandability

Single Authoritative Sources

How it works

- ➊ Every record has a stable ID
- ➋ Other systems link or transclude by ID
- ➌ Shared schemas define information



What it enables

- ➔ Each discipline can see its own viewpoint
- ➔ Edit once, and every view updates
- ➔ One element can be traced across systems
- ➔ Reviews see one version, not multiple

Threads Across Organizations

How it works

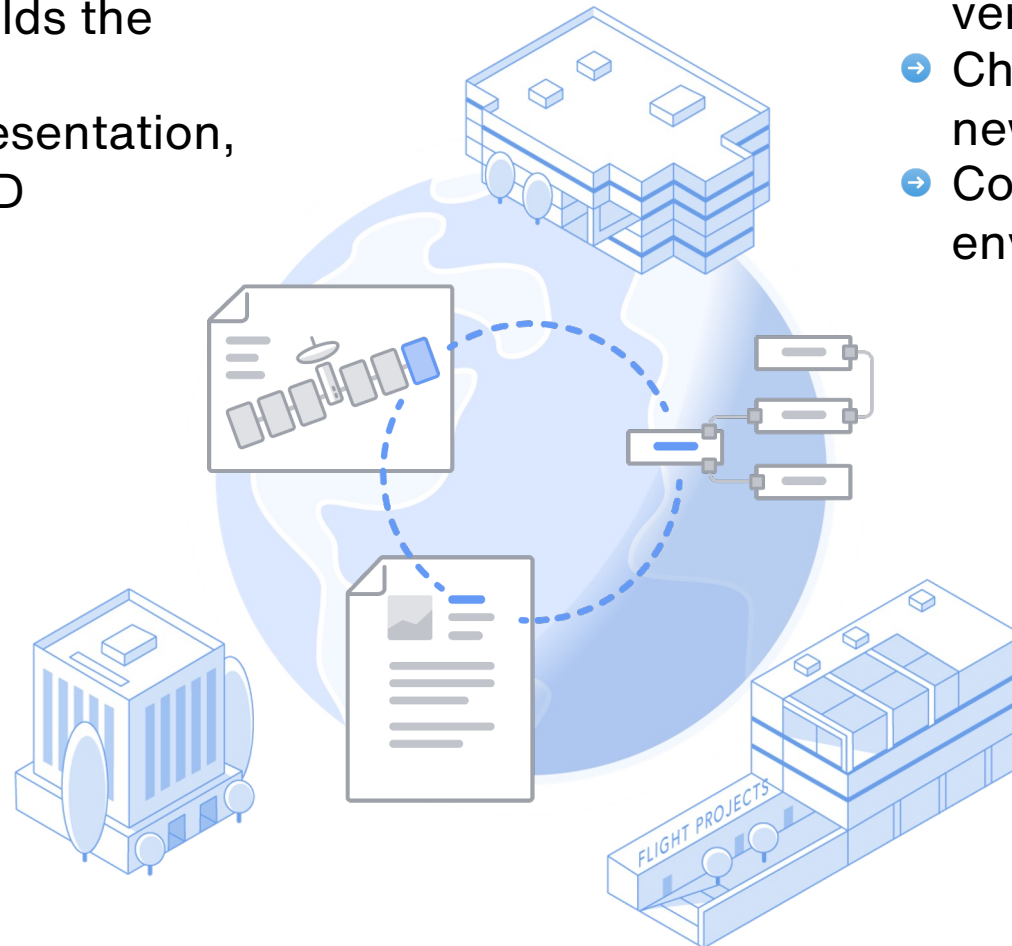
- ➊ Originating organization holds the authoritative record
- ➋ Partners get a synced representation, tied back by an exchange ID

What it enables

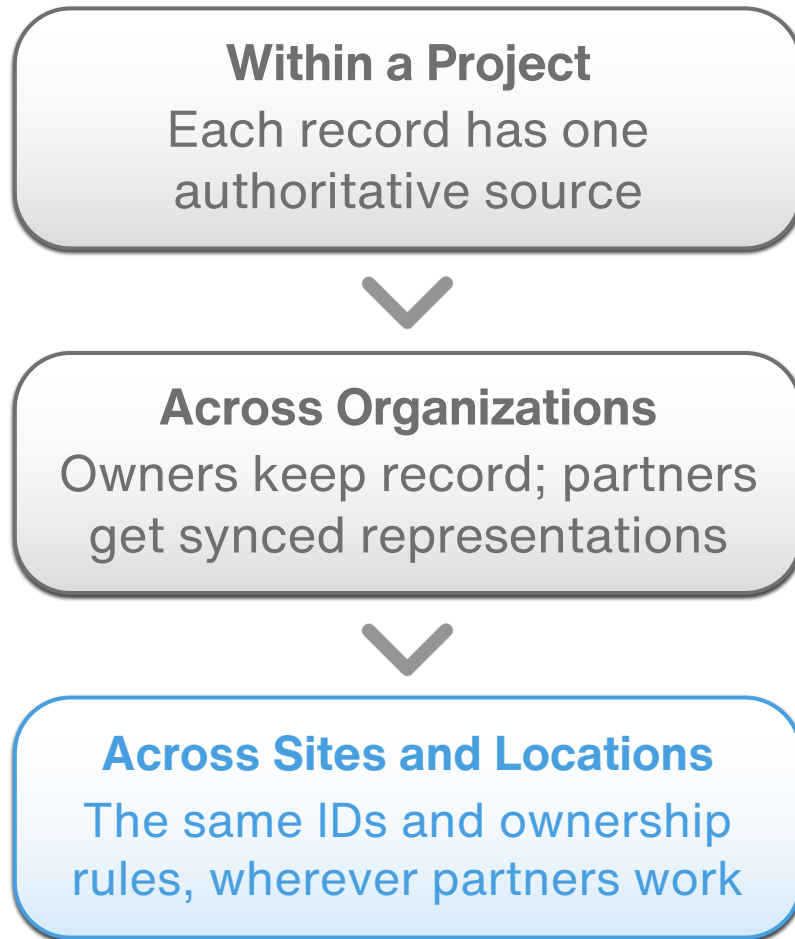
- ➔ Requirements flow down, verification information flows up
- ➔ Changes arrive as updates, not as new documents to reconcile
- ➔ Connected heterogeneous environments

**Unbroken
traceability
record and
chain**

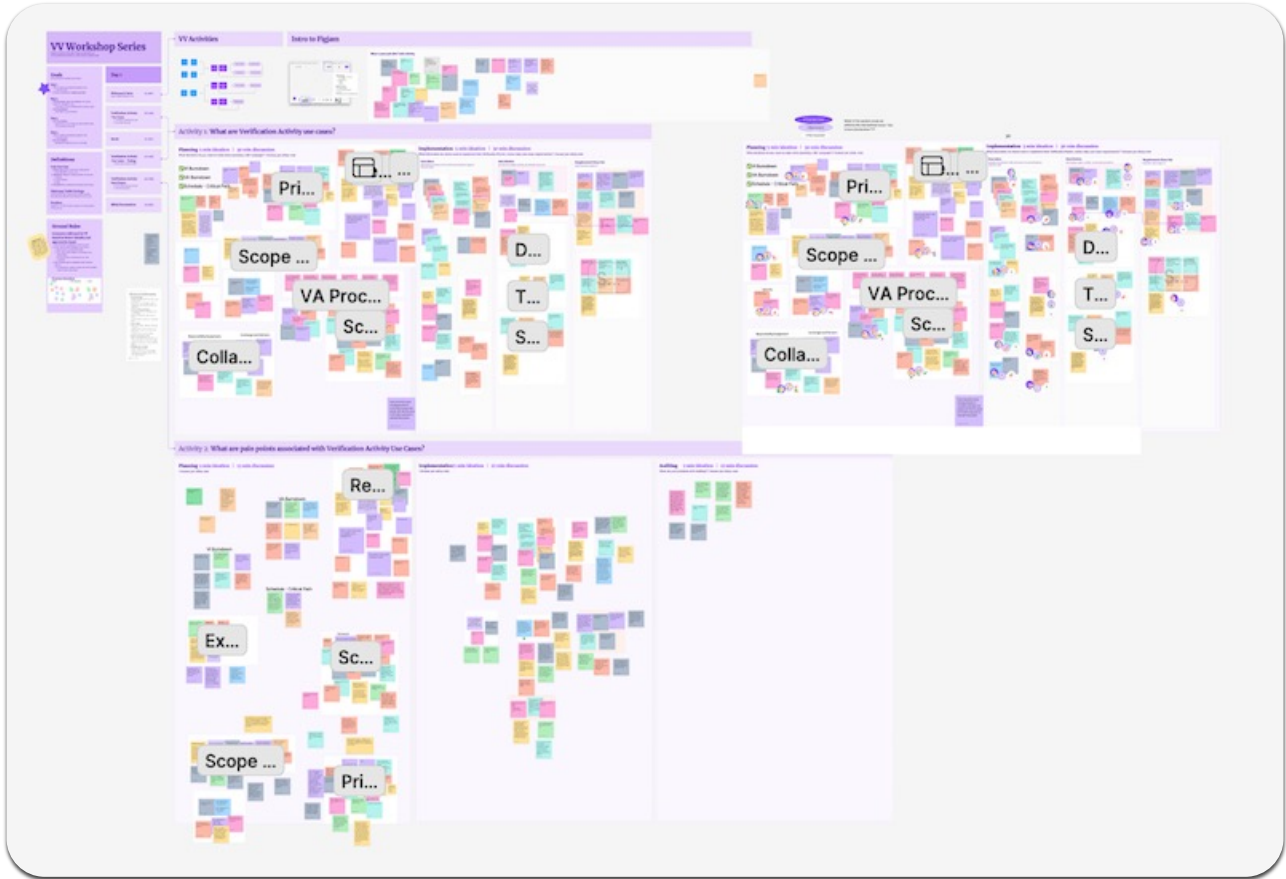
**Partners can
keep their own
environments**



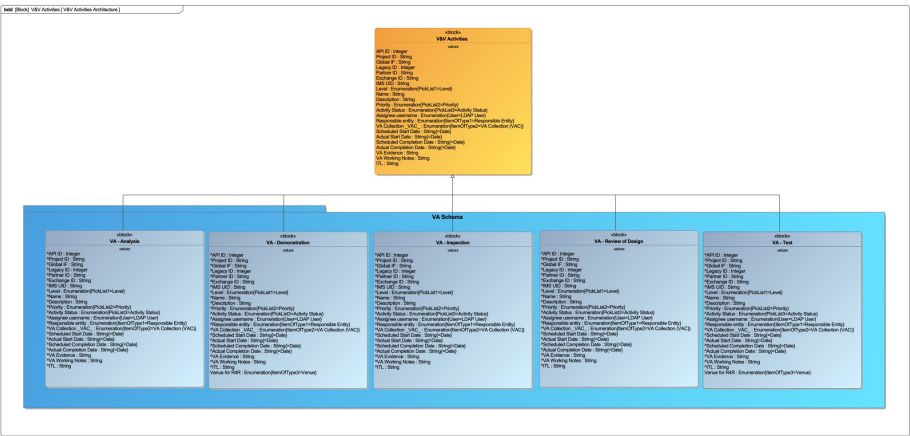
One Thread, No Matter Where



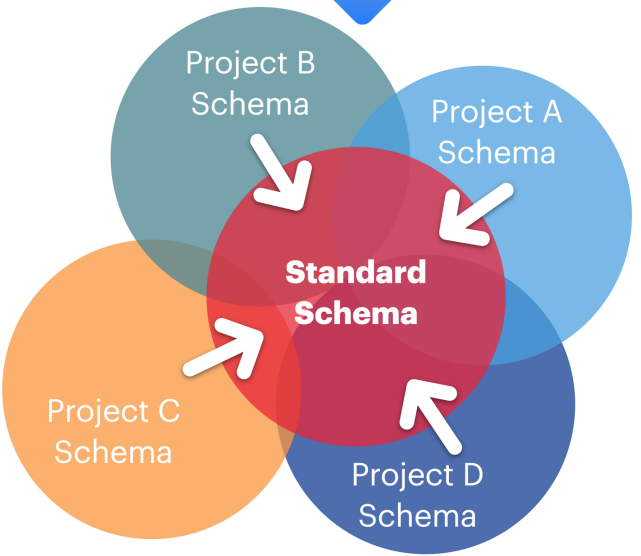
Tools Don't Get Adopted — Workflows Do



→
formalize

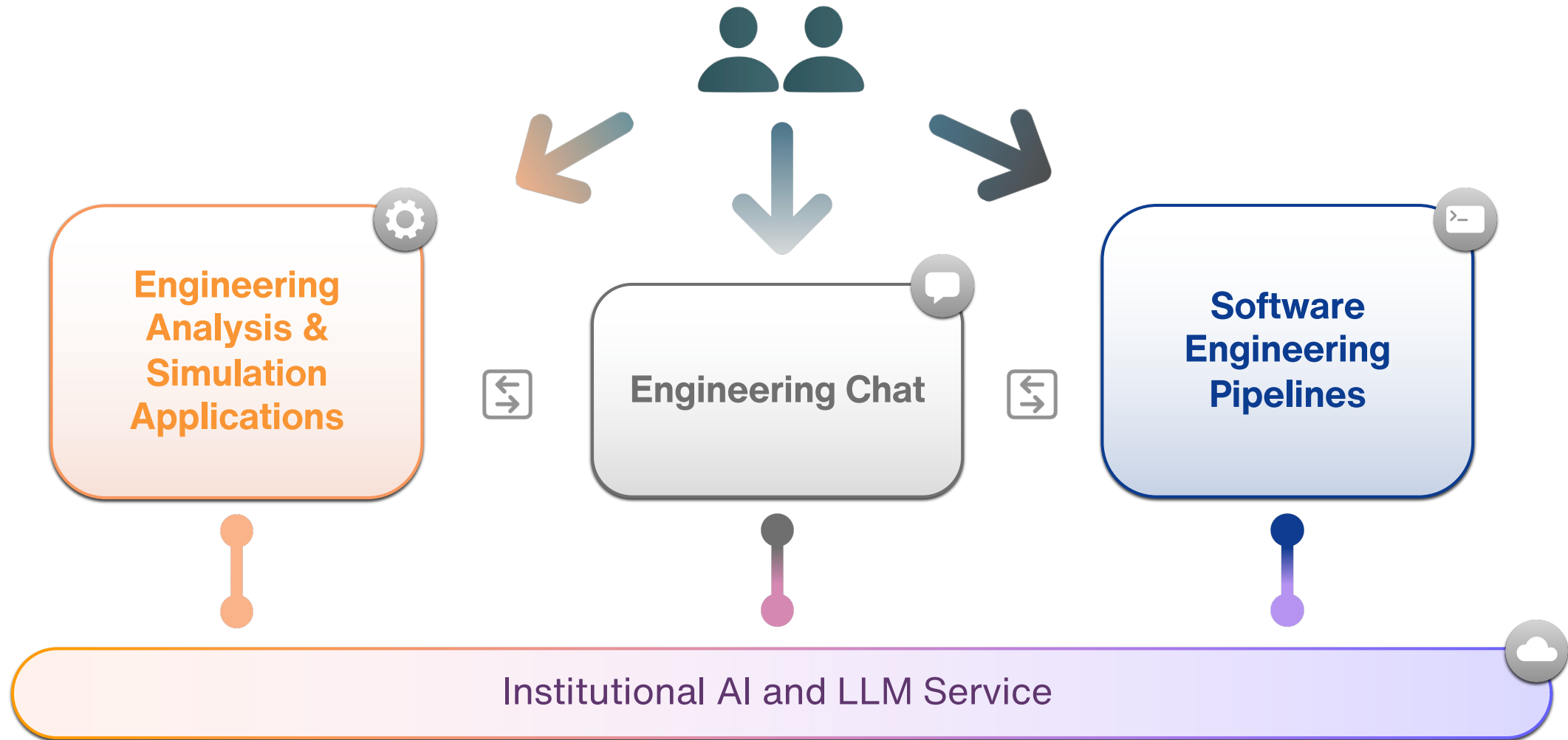


↓
converge



Cross-division workshops with engineers & function owners capture use cases and pain points, then define schema and workflows by consensus

Integrated AI — More than Just an Answer Machine



Lessons Learned and What's Next

Technology

Link, don't copy. One authoritative source per record; everything else links to or transcludes it.

Stay tool-agnostic. Open interfaces let any tool plug in or be swapped out.

Process

Standardization before Automation.

Automation and cross-org exchange depend on shared structure and defined interfaces.

People

Build it with the people who'll use it.

Start from their workflows, and pilot where the pain is — the tool needs to fit the use case.

