AGENT ZERO

FIELD PAPERS ON APPLIED ARTIFICIAL INTELLIGENCE

01

How an AI-native operating system is built

A six-layer method for companies that already run — and cannot stop running while it is installed.

SERIES

Paper 01, published 2026

SUBJECT

Operating systems · data models · agents · automation

EDITION

Revision 1.0 · 2026 · 8,600 words

CONTENTS

FRONT MATTER

About this paper

This paper describes a method for replacing a company's fragmented software stack with a single system designed around artificial intelligence, without interrupting the operation while it happens. It is written to be read once, in order, by someone deciding whether the work is worth doing.

Scope

The subject is the class of company that has outgrown spreadsheets but has never installed enterprise software: roughly twenty people, revenue between two and ten million dollars, each department living in its own low-code tool — an application configured rather than programmed. The method applies at other sizes; the arithmetic is simply less dramatic. Chapter 3 explains why.

How this paper is layered

The main text assumes no technical background. It defines each term the first time it appears and states the reasoning behind every recommendation rather than asserting it. Wherever a subject has a technical layer that a builder would need and an owner would not, that material is separated into a box like the one below. Skipping every box leaves the argument intact.

> **TECHNICAL NOTE — HOW TO READ THE BOXES**
>
> Boxes contain implementation detail: schema decisions, model selection, evaluation criteria, failure handling. They are addressed to whoever will build or supervise the build. Nothing in the main text depends on them.

Conventions

- **Layer** refers to one of the six stages of the method. Layers are numbered 01 to 06 and are performed in order.
- **Entity** refers to a noun the business runs on — client, project, invoice — modelled as an object in a database.
- **Agent** refers to a bounded software job that uses a language model, described in full in Layer 05.
- Figures are numbered and referred to by number.

On the numbers in this document

Every quantity in this paper is illustrative and labelled as such. The purpose of a worked example here is to show the shape of a calculation, not to supply a figure worth copying. Model pricing, licence costs and

build costs move quickly; the formulas outlive them. No client engagement is described, and no adoption, saving or performance statistic is claimed.

> **PROVENANCE**
>
> The method described here was derived from building and operating systems of this kind first-hand, not from surveying other people's projects. Where the text refers to how these projects fail, it refers to failure modes observable in the structure of the work, not to a proprietary dataset of engagements.

PART I

The argument

Why consolidation precedes intelligence, what the resulting system is, and the conditions under which the return concentrates.

01

CHAPTER ONE

The access problem

A common pattern of adoption inside companies is to add intelligence on top of a disorganised stack: an assistant subscription for the team, a generative feature inside the CRM, a chatbot on the website. The tools stay separate, the data stays scattered, and the model is asked to reason about a business it cannot see.

This chapter sets out why that arrangement underperforms, and why the highest-return project involving artificial intelligence usually contains very little artificial intelligence at the start.

The constraint is access, not capability

A language model reasons over the information placed in front of it. It has no standing view of a company. Everything it knows about a client, a project or an invoice has to be assembled and handed to it at the moment of the request, inside a finite context window — the quantity of information a model can consider in a single operation. When the underlying information is distributed across half a dozen systems that do not reference each other (Figure 1), that assembly is either done manually by a person — which removes the saving — or done partially, which produces answers that are fluent, confident and incomplete.

The failure is easy to miss because it does not look like a failure. A model given half the picture does not announce that it is missing the other half. It answers.

> A model given half the record does not report the gap; it answers anyway.

This is the mechanism by which a pilot stalls at the pilot stage. The demonstration works, because a demonstration is run on a curated example. Production does not, because production is the uncurated case. The team notices the discrepancy, and trust — which is the actual asset being built — is spent. A tool that is not trusted is not used, and a tool that is not used is cancelled.

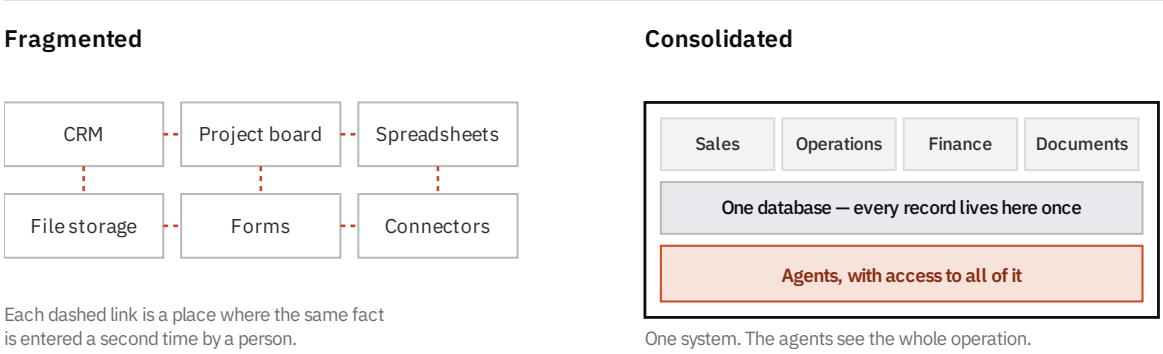

Figure 1. The same operation in two states. On the left, information is entered more than once and no system holds the complete record. On the right, one database holds each fact once and the agents read across all of it.

What consolidation makes possible

When the operation lives in one place, three capabilities appear that are not available at any price while it does not.

1. **Questions become answerable in one step.** "What did this client bill last quarter, and what did that work cost to deliver?" stops being a reporting task and becomes a query.
2. **Generation becomes composition.** When the system knows what a project is, who owns it, which documents belong to it and what stage it is in, producing a proposal is assembling known facts rather than inventing plausible ones. The difference matters: the first is verifiable, the second is not.
3. **A category of manual work disappears rather than being automated.** Much of what a team does by hand is moving information between systems. With one system, that work has no object.

TECHNICAL NOTE — WHY RETRIEVAL DOES NOT SUBSTITUTE FOR CONSOLIDATION

Connecting a model to scattered sources through retrieval improves matters but does not resolve them. Retrieval returns passages that resemble the query; it does not guarantee that the returned set is complete, and completeness is exactly what operational questions require. "Which invoices are overdue?" is a query with a correct answer, not a similarity search. Answering it reliably requires a schema — a declared structure of entities and fields — rather than an index of passages.

Retrieval remains the right tool for unstructured material — contracts, transcripts, correspondence — once the structured layer underneath it exists to scope the search.

PRINCIPLE

The usefulness of artificial intelligence inside a company is bounded by the completeness and connectedness of the data it can reach, not by the capability of the model. Work that raises the bound is therefore worth more than work that raises capability.

02

CHAPTER TWO

What an AI-native operating system is

An AI-native operating system is a single custom system built around how one company operates, in which all operational information lives in one database and language models are part of the workflows rather than attached to them.

Four properties define it.

One point of entry

The team works in one place rather than five. The recurring internal question of where something is kept stops being asked, which removes a class of interruption that rarely appears in any cost analysis but consumes part of the day.

One database

Client, project, task, document, invoice and person exist once as connected records. There are no parallel copies to reconcile, because there are no parallel copies.

Every department on the same records

Sales, operations, finance and support see different views of the same objects. A handoff between departments becomes a change of state on a record rather than a message asking someone to do something.

Models inside the workflow

Documents arriving are read and structured on arrival. Documents leaving are drafted from the record. Questions are answered from the database. Incoming requests are classified before a person sees them.

Three things it is not

It is not an ERP. Enterprise resource planning software supplies a model of how a business should operate and requires the business to conform to it. The relationship here is inverted: the model of operation is derived from the company in Layer 01 and encoded in Layer 03.

It is not custom software in the older sense. The economics that made bespoke systems impractical for a twenty-person company — long specification cycles, expensive change — have shifted substantially. That shift is what makes the method described here available at this size at all.

It is not an automation layer over the existing tools. Connecting those systems with automations preserves the fragmentation and adds a dependency. It is the arrangement the method replaces.

TECHNICAL NOTE — "NATIVE" AS A DESIGN CONSTRAINT

A system *with* AI adds features to a product designed before models were assumed. A system that is *native* is designed assuming a model is available at every step, which changes the design itself: fewer required fields, because values can be extracted rather than typed; fewer forms, because intent can be parsed; fewer screens, because a query interface replaces a report builder.

The practical test: if removing the model would leave the system merely less convenient, it is a system with AI. If removing the model would leave it unusable as designed, it is native.

03

CHAPTER THREE

Where the economics concentrate

The method applies at any size. The return on it does not. This chapter describes the conditions under which the work pays back fastest, and the conditions under which it should not be started.

The conditions that concentrate return

Nothing to migrate away from. A large company undertaking this has to unwind years of accumulated systems, integrations built around them, and the internal agreements that depend on both. A company whose stack is spreadsheets and monthly subscriptions has none of that. The same project is a multi-year programme in one case and a single quarter in the other.

Percentage impact. Removing sixty hours of weekly manual work from a twenty-person company — an illustrative figure — is the equivalent of more than one full-time person, and those hours are disproportionately the owner's and the most expensive employees'. The same sixty hours inside a five-hundred-person company is not detectable.

A skipped generation. A company that never installed enterprise resource planning software does not have to remove it. It moves directly from scattered tools to a native system, in the same way that markets which never built fixed telephone lines moved directly to mobile networks. Waiting until the company is large enough for conventional enterprise software is planning a migration that no longer needs to happen.

DIAGNOSTIC

Two symptoms indicate the conditions above more reliably than revenue does. First: a recognisable part of the team's day is spent moving information between tools. Second: the owner cannot answer an operational question without asking someone to assemble a report.

The conditions that argue against starting

- **The process is still changing monthly.** A company still locating its business model should not encode that model in a system. The process is found first and built second; doing it in the other order produces a system that obstructs the search.
- **Enterprise software is already installed and genuinely used.** The project in that case is different: connect to it and place agents on top, rather than replace it.
- **No one internal can decide.** The work requires a person with authority to answer a substantial set of uncomfortable questions about how the company should operate — questions that surface disagreements which have been avoided. Without that person allocated, the project reaches the first of those questions and stops.

PART II

The method

Six layers, performed in order. Each produces the input to the next; the first three produce documents rather than software.

04

CHAPTER FOUR

The six layers

The method has six layers (Figure 2). Each produces the input to the next, and the sequence carries more weight than any technical decision made inside any single layer.

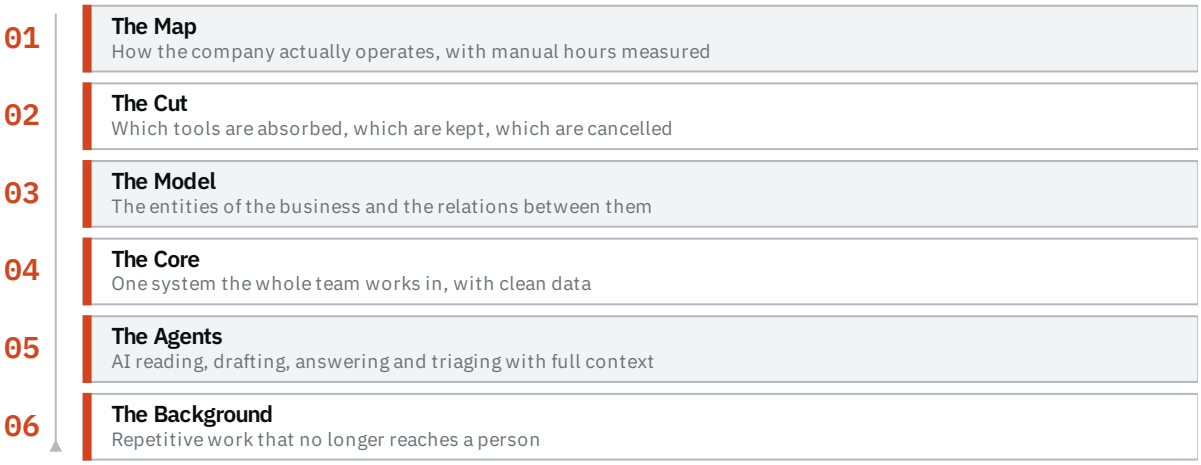

Figure 2. The six layers in build order. The first three produce documents rather than software; they determine what the last three build.

The consistent temptation is to begin at Layer 05, because agents demonstrate well and the first four layers do not. Beginning there produces an agent operating over incomplete and contradictory data, which generates confident errors — the specific failure that is most expensive to a team's willingness to use the system at all.

> PRINCIPLE — THE ORDER
>
> Map, then cut, then model, then build, then agents, then automation. Where a proposal reverses two of these steps, the question to ask is which problem the original order was solving and how the reversal addresses it.

What each layer produces

LAYER	DELIVERABLE	NATURE
01 Map	Inventory of workflows with handoffs, duplicate entry and measured manual hours	Document
02 Cut	Decision table for every tool; cancellations executed	Document
03 Model	Entity-relationship diagram and data dictionary	Document
04 Core	System in production; old stack switched off	Software
05 Agents	Four agent classes, evaluated and released	Software
06 Background	Automations with audit log and exception queue	Software

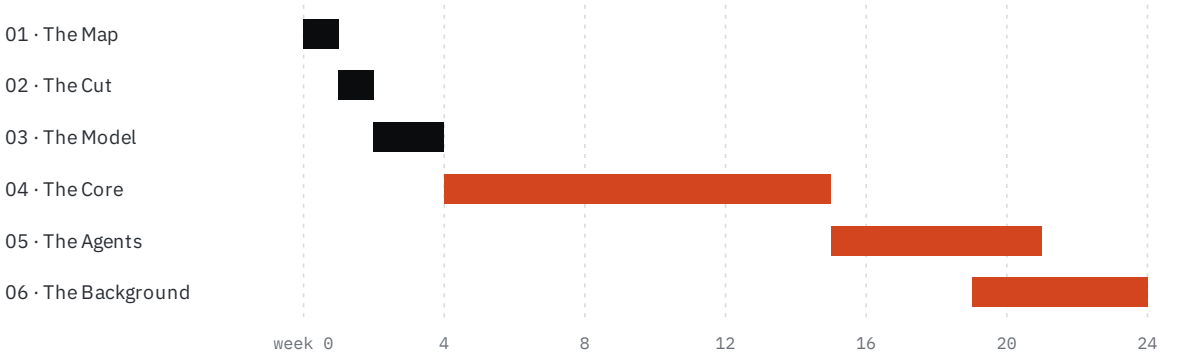

Figure 3. An illustrative calendar for a twenty-person company. Durations vary with complexity and, more than anything else, with how quickly the company can make decisions.

L1

LAYER ONE · PRODUCES A DOCUMENT

The Map

Record how the company operates in practice, with manual hours measured.

Mapping means recording how the company operates in practice — including its shortcuts, exceptions and rework — so that later decisions are made against evidence rather than assumption. It produces a document, not software, and it is the layer with the least visible output, which is why it is the one skipped.

INPUT	OUTPUT
Access to the team and roughly one week of concentrated attention. No software.	An inventory of workflows with trigger, steps, handoffs, duplicate entry and measured hours.

Procedure

1 · Enumerate the workflows, by department

Sales, fulfilment, finance, operations, support. For each workflow, record three things: the event that starts it, the steps in between, and the condition that makes it complete. A working threshold: anything that happens more than once a week is a workflow and belongs on the list.

2 · Walk each workflow with the person who performs it

Not with the person who supervises it. The supervised account of a process and the performed account differ systematically, and the performed one is the one being replaced. The reliable technique is to sit beside the person while they do the work and have them narrate it, rather than to interview them about it afterwards.

3 · Mark every handoff

A handoff is any point at which work passes between two people or between two tools. These are the points at which work waits, is lost, or is entered again. They become the automation list in Layer 06, already ordered by cost.

4 · Mark every duplicate entry

Duplicate entry is any fact typed into two places. It has two costs: the time spent today, and the divergence tomorrow. Once two copies of a fact disagree, both become unreliable, and the team begins to verify rather than trust.

5 · Measure the hours

For each workflow, estimate weekly hours spent on the manual portion, with the person who spends them. Precision is not required; magnitude and ownership are. These numbers order everything downstream: the migration order in Layer 04, the evidence for which agent is built first in Layer 05, and the automation order in Layer 06.

> **TEST OF COMPLETENESS**
>
> If a weekly hours figure cannot be placed beside a workflow, the workflow is not yet understood well enough to be automated. If nothing in the finished map is surprising, the map records assumptions rather than observations.

What the map typically surfaces

- Two people maintaining the same list independently, neither aware of the other.
- A spreadsheet that is functionally the company's system of record, stored on one laptop.
- A step that exists because a single client requested it once, retained by inertia.
- A constraint understood as capacity that is in fact waiting.

TECHNICAL NOTE — WHAT TO CAPTURE PER STEP

For each step, record: actor, tool, input, output, the decision made if any, and the rule behind that decision. The decision rules are the material that becomes agent instructions in Layer 05, and they are almost never written down anywhere else. Where a rule cannot be articulated — where the step is judged by eye — the step is flagged as requiring human judgement and excluded from automation candidates.

L2

LAYER TWO · PRODUCES A DOCUMENT

The Cut

Decide, tool by tool, what is absorbed, what is kept and what is cancelled.

The consolidation audit sorts every tool in the stack — including tools used by one person — into three categories. There is no fourth category, and the absence of one is the point: a tool with no decision attached to it survives by default, which is how stacks accumulate.

INPUT	OUTPUT
The workflow inventory from Layer 01 and the billing statement listing every subscription.	A decision table per tool, a quantified monthly saving, and the list of integrations that must be built.

CATEGORY	DEFINITION	TYPICAL MEMBERS
ABSORB	Tools whose actual function is holding structured records with views on top of them. They become part of the new system.	Project boards, a CRM used as a contact list, tracking spreadsheets, form tools, internal wikis
KEEP	Tools performing a specialised job that should not be rebuilt. They remain and are connected through integrations.	Accounting and statutory invoicing, email, calendar, payroll, regulated industry software
CANCEL	Tools with no real use, tools duplicating another, and subscriptions surviving on inertia.	The second task tool, an unadopted pilot, licences for departed staff

> **TEST FOR ABSORPTION**
>
> If the primary value of a tool is that things are organised inside it, it is absorbed. Organising records is precisely what the consolidated database does — connected to everything else rather than isolated from it.

The criterion for keeping

A tool is kept if it satisfies at least one of three conditions: it addresses a regulated problem where the cost of error is legal rather than operational; its value resides in an external network the company does not control, such as email, calendar or banking; or rebuilding it would cost more than the remainder of the project. A tool satisfying none of the three is a candidate for absorption regardless of how long it has been in use.

Cancellation precedes construction

The cancel category is executed immediately, before anything is built. It produces the first return of the project before the first line of code, and it forces an explicit conversation about which tools are genuinely used — a conversation that is otherwise deferred indefinitely.

TECHNICAL NOTE — INTEGRATION DIRECTION

For each kept tool, decide before building which system holds the authoritative copy of each shared field, and in which direction data moves. Bidirectional synchronisation between two systems that both accept edits is a structural source of silent data corruption; it should be adopted deliberately and rarely, with an explicit conflict rule, rather than by default.

L3

LAYER THREE · PRODUCES A DOCUMENT

The Model

Define the entities, their relationships,
and where the truth lives.

The data model is the set of entities the business runs on, the relationships between them, and the decision about where the authoritative copy of each fact lives. Everything built afterwards rests on it, and errors in it are inherited by everything above.

INPUT	OUTPUT
The map from Layer 01 and the decisions from Layer 02.	An entity-relationship diagram, a data dictionary — every entity, its fields and their permitted values — and a written record of where the truth lives for each entity.

Step 1 · Enumerate the entities

An entity is a noun the business operates on: client, project, task, invoice, document, team member, lead, order, vendor, asset, contract. As an illustrative order of magnitude, expect between fifteen and thirty. Fewer than ten usually indicates complexity being hidden inside free-text fields; more than forty usually indicates attributes being modelled as entities.

Step 2 · Define the relationships

The anchor entities are the two or three that nearly everything else attaches to; in most companies they are the client and the unit of work. A client has many projects. A project has many tasks, many documents and one invoice per milestone. A team member is assigned to many tasks. Drawing this (Figure 4) produces a complete picture of the company's structure, which a stack of separate tools cannot produce.

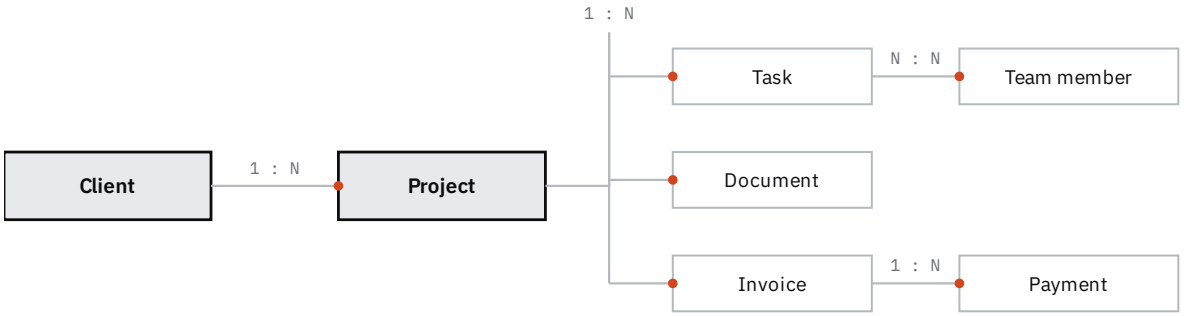

Figure 4. A minimum data model. Identifying the two or three anchor entities — the ones nearly everything else attaches to — is most of the work of this layer.

Step 3 · Locate the truth

This step establishes the single source of truth: for each entity, one authoritative location. If client contact information lives in the system, it does not also live in a spreadsheet maintained separately. Once a fact exists in two places they eventually disagree; once they disagree the team returns to the copy it controls. This is the mechanism by which systems delivered correctly are abandoned two years later, and it is prevented here or not at all.

> TWO RULES
>
> **Model the business as it is, plus one size.** Design for roughly twice current revenue and stop. Systems designed for a far larger future become abstract enough that no one but their author can change them, and unused abstraction is a maintenance cost with no offsetting benefit.
>
> **Every record attaches to something.** If a document cannot be tied to a client, a project or a process, the reason for storing it should be stated explicitly or the document should not be stored.

The questions that determine the model

- What constitutes a unit of work here — a project, an order, a case, a contract? The chosen word will be used by the entire company for years.
- Can one client hold several units of work simultaneously? Several contacts with distinct roles?
- Is billing by milestone, by hour, by delivery or by subscription — and are several of these in use at once, depending on the client?
- What happens to a unit of work cancelled midway: deleted, archived, or marked?
- Who is entitled to see the margin on a piece of work?

These questions are uncomfortable in a predictable way: they reveal that different departments use the same word for different things. Surfacing that is part of the value of the layer.

TECHNICAL NOTE — SCHEMA DECISIONS WORTH MAKING EARLY

- **Identity.** Assign every entity a stable internal identifier that is never reused and never displayed as though it carried meaning. Human-readable codes change; identifiers must not.
- **State.** Model lifecycle explicitly as a set of permitted states and permitted transitions, rather than as a free-text status field. Automations in Layer 06 attach to transitions.
- **Time.** Record both the time an event occurred and the time it was recorded. Reporting that cannot distinguish the two produces figures that change retroactively.
- **Deletion.** Prefer archival with a reason over deletion. Agents reading history need to know that something ended, not merely that it is absent.
- **Money.** Store amounts with their currency and the rate used at the time, never as a converted number alone.

L4

LAYER FOUR · PRODUCES SOFTWARE

The Core

Move every department into one system with clean, connected data. No agents yet.

This layer builds the system the team works in: databases, screens and views reading from the model defined in Layer 03. One instruction governs it — nothing is automated yet.

INPUT	OUTPUT
The approved data model and the migration order derived from measured hours.	A system in production, every department inside it, and the previous stack switched off.

Migration order

One department at a time, beginning with whichever recorded the most manual hours in the map. That department moves fully, works from the system daily, and only then does the next department begin. Moving every department simultaneously removes the fallback position at the exact moment it is needed, since the first week of a migration is when defects surface.

Rebuild the view, preserve the motion

For each department, the views are rebuilt to resemble the way that department already works. A board remains a board; a pipeline remains a pipeline. The mental model and the daily motions are preserved, and only the connectedness underneath changes.

This is the mechanism behind adoption, and it is worth stating plainly because it is usually attributed to training or change management. The system is adopted because it was designed from a map of how the team already operates, and because the team is having tools removed rather than added. A system that arrives as an additional obligation rather than as a replacement competes with the tools it was meant to replace, and loses.

> **CONSTRAINT**
>
> No automations and no agents until the department has fully moved. Consolidating and automating concurrently produces automation over unrepaired processes, and once code depends on a process, changing the process becomes expensive enough that it stops happening.

Completion criteria per department

- [ ] People enter the system without being reminded to.
- [ ] The parallel spreadsheet has not been opened in two weeks.
- [ ] Historical data that matters is migrated and verified against the source.
- [ ] Someone inside the department can resolve a question without contacting whoever built the system.
- [ ] A report previously assembled by hand now comes from a view.

Historical data

Migrate what is consulted and what must be retained; archive the remainder outside the live model. Importing many years of inconsistent records into a new system contaminates it on the first day and makes every subsequent data quality problem harder to attribute. A workable rule is to migrate the last two or three financial years into the live model and keep everything earlier accessible but separate.

TECHNICAL NOTE — MIGRATION VERIFICATION

Verify migrations by reconciliation rather than by inspection: record counts per entity, totals for every monetary field, and a random sample of complete records compared field by field against the source. Run the reconciliation twice — once immediately, once after a week of live use — and keep the report. The second run catches transformation errors that only appear once new records interact with migrated ones.

L5

LAYER FIVE · PRODUCES SOFTWARE

The Agents

Place bounded agents on top of a complete record, and evaluate them before release.

With a complete and connected record in place, this layer proceeds quickly, because the constraint identified in Chapter 1 has been removed. An agent here is not a chat interface: it is a bounded job with declared inputs, declared data access, an assigned model, a defined behaviour under uncertainty, and an audit trail.

INPUT	OUTPUT
A complete and connected record from Layer 04, and the decision rules captured in Layer 01.	Four agent classes in production, each with an evaluation record and a defined behaviour under uncertainty.

Figure 5. The components of a production agent. The rightmost branch — defined behaviour when the agent is not confident — is the component most often omitted and the one that determines whether the team trusts the system.

Four agents, in build order

1 · Document intake

Receipts, invoices, estimates and contracts arrive as files and attachments. The agent reads them, extracts the defined fields and creates structured records. It is built first for two reasons: it supplies the database with clean structured data, and it replaces the most repetitive work in the company, which makes the change perceptible early rather than late.

2 · Generation

Proposals, statements of work, reports and client updates. Because the system holds the full context of the client and the work, drafting is composition from known records rather than invention. A human approves before anything reaches a client; the saving is in the drafting, not in the approval.

3 · Operational answers

An interface to the complete database that anyone in the company can query in ordinary language. Which work is behind schedule; what a client was billed last quarter; which invoices are overdue. This agent changes behaviour more than the others, because the cost of asking a question about the business falls to the cost of typing it and the frequency of asking rises accordingly.

4 · Triage and routing

Inbound messages, requests and form submissions are read, categorised, and assigned to the correct person with the correct priority before anyone examines them. It is the least visible of the four; its effect is on interruption rather than on output.

> **ARCHITECTURE — MODEL ROUTING**
>
> Not every task requires the most capable model available. Classification and extraction are routed to small fast models; summarisation and routine drafting to a mid tier; reasoning, client-facing drafting and decisions to frontier models — the most capable tier available at the time (Figure 6). Applied deliberately, this reduces the running cost of the system, because the frequent tasks are the cheap ones, without affecting quality where quality is visible.

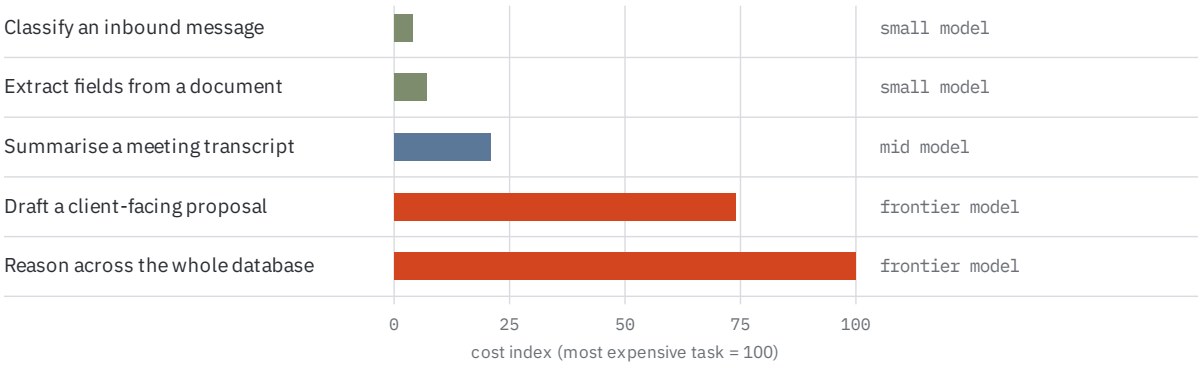

Figure 6. Illustrative cost per task by model tier, indexed to the most expensive task. The distribution of a company's actual volume across these tiers matters more than the unit prices: the cheap tasks are usually the frequent ones.

TECHNICAL NOTE — EVALUATING AN AGENT BEFORE RELEASE

- **Run in parallel, not instead of.** For a defined period the agent performs the work alongside the person who performed it. Both outputs are retained.
- **Measure agreement, not impression.** "Across one hundred documents, on how many did all five extracted fields match?" is answerable; "Does it seem accurate?" is not.
- **Define behaviour under uncertainty.** An agent that declines and routes to a queue is more valuable than one that produces a plausible value. Uncertainty needs a destination.
- **Version the instructions.** Treat agent instructions as code: versioned, reviewed, and recorded against each execution, so that a change in behaviour can be attributed to a change in instruction.
- **Keep the evaluation set.** The parallel-run data becomes the regression test — the fixed set of cases re-run after every change, including model upgrades.

L6

LAYER SIX · PRODUCES SOFTWARE

The Background

Convert the handoffs and repetitive tasks recorded in Layer 01 into background work.

The final layer converts work that should not require a person into work that occurs on its own: state changes that send client notifications, dates that trigger reminders, completed milestones that produce invoices, documents that generate and file themselves.

INPUT	OUTPUT
The prioritised list of handoffs and repetitive tasks from Layer 01, with their measured hours.	Background automations with an audit log, an exception queue, and a documented disable path.

The list is not invented at this stage. It comes from Layer 01: every handoff and every repetitive task recorded there is a candidate, already ordered by the hours measured against it.

Selection criterion

A task is a candidate when it satisfies three conditions: it recurs, its outcome is predictable, and an error is reversible. Where the third fails — an invoice sent to the wrong client, a message sent on the company's behalf — the task is not excluded; a single approval step is inserted before the effect reaches anyone outside the company.

TRIGGER	AUTOMATIC ACTION	APPROVAL
Work moves to delivered	Closing message sent; feedback requested	None
A task passes its committed date	Reminder to owner and department lead	None
A billable milestone completes	Invoice assembled and held as a draft	One click
A document arrives from an unknown vendor	Vendor record created; validation requested	One click
An invoice reaches 30 days overdue	Escalating collections sequence begins	One click to escalate

CONSTRAINT

Only a process that has already been repaired is automated. Automating a process that has not been repaired makes it permanent, because the cost of changing it now includes changing the code that depends on it.

The observable result

The evidence that this layer worked is not a dashboard. It is that the work stops being discussed. Nobody asks whether the reminder was sent, because reminders are not sent by people. The absence of the conversation is the deliverable.

TECHNICAL NOTE — AUTOMATIONS NEED AN EXCEPTION QUEUE AND AN OFF SWITCH

Every automation requires three things beyond its logic: an idempotency guarantee so that a retry cannot duplicate an effect, an exception queue where failures accumulate visibly rather than silently, and a documented way to disable it without a deployment. An automation that fails quietly is worse than no automation, because the work it was doing is now nobody's.

PART III

Execution

What the finished system looks like, how projects of this kind fail, what they cost, how they are governed, and where to begin.

05

CHAPTER FIVE

A finished system, described

The following description is a composite constructed for illustration. It is not an account of a client engagement, and the quantities in it are chosen to be plausible rather than reported.

Before

A twenty-person company running several hundred active jobs across a spreadsheet-style database, a set of Excel files, a document cloud and a PDF reader. Five people leading work, each following a personal variation of the process. Billing assembled manually twice a month. Problems reaching the owner at the point where they have already become problems.

After the six layers

- One system, one point of entry, holding the entire operation.
- A data model in which the real entities of the business are connected to each other.
- Inbound documents read on arrival and converted into records.
- Proposals and statements of work drafted from the complete client context.
- Billing executed against the pricing rules that actually exist, including the exceptions.
- A client portal showing progress without anyone exporting a file.
- Background automations carrying the reminders, the notifications and the document filing.

> The change the team registers is not the intelligence but the absence of transcription.

The second-order effect

When the operation becomes queryable, the frequency of certain decisions changes. A question that cost two hours of assembly was asked monthly; the same question costing one sentence is asked daily. Over a year, the difference between deciding with monthly information and deciding with daily information is larger than the hours recovered — and it is the part of the return that no calculation performed beforehand will capture.

06

CHAPTER SIX

Failure modes

The failure modes below are structural: they follow from the order of the work rather than from the competence of anyone performing it. They are listed roughly in the order in which they are encountered.

Beginning with the agents

The one from which several others follow. It demonstrates quickly and produces an agent answering confidently over incomplete data. The team discovers this, and the internal credibility of the entire category is spent for a considerable period.

Mapping in a meeting room

A map produced in a management meeting describes the company that management believes it has. The map that is useful is produced beside the person doing the work. A map containing no surprises is a record of assumptions.

Moving every department at once

A single cutover — every department moved in one operation — appears efficient and removes the fallback at the moment defects are most likely. One department at a time, fully moved, before the next.

Consolidating and automating together

Produces automation over processes that have not been repaired, and code that later makes repairing them expensive. Layers 04 and 06 are separated for this reason.

Modelling for a hypothetical scale

Designing for a company many times larger produces abstraction that only its author can navigate. One size up, and no further.

Leaving the parallel spreadsheet in place

While an unofficial copy of the truth exists, the system competes with something that has no rules and loses. Retiring the parallel copy is a management decision, not a technical one.

No internal owner

The work requires a person inside with authority to decide and time genuinely allocated. Without one, the project advances to the first difficult decision and stops there indefinitely.

Treating delivery as adoption

A delivered system is not an adopted system. The measures that matter are the share of the team entering it unprompted and the number of previous tools switched off — not whether it is in production.

07

CHAPTER SEVEN

Cost and return

This chapter gives the structure of the calculation rather than a price. A price quoted here would be wrong for most readers and out of date for all of them; the structure remains usable.

Cost

LINE	BEHAVIOUR	BASIS OF ESTIMATE
Design and build	One-off, concentrated at the start	Weeks of work × cost per week
Internal time	One-off, real, routinely omitted	Team hours in mapping, decisions and testing
Infrastructure and models	Recurring, varies with volume	Cost per operation × operations per month
Maintenance and change	Recurring	A percentage of build cost per year

The line most often omitted is the second. Internal time appears on no quotation, is paid regardless, and correlates more strongly with the outcome than any other input.

Return

1. **Cancelled licences.** Derived from Layer 02, realised in the first month, and the only component that is unambiguous.
2. **Manual hours removed.** Derived from Layer 01: weekly hours × loaded cost — salary plus employment cost — of the person spending them × working weeks.
3. **Capacity without headcount.** The largest component and the hardest to evidence in advance: revenue growth that does not require proportional hiring.
4. **Errors that stop occurring.** Invoices not missed, deliveries not dropped, records that do not contradict each other. Difficult to estimate beforehand and conspicuous afterwards.

WORKED EXAMPLE — ILLUSTRATIVE ONLY

Suppose the map records 60 hours of weekly manual work, and the loaded cost of the people spending them averages 25 currency units per hour. That is 1,500 per week, or 75,000 across 50 working weeks, in work that can be removed or substantially reduced. If six subscriptions totalling 450 per month are also cancelled, add 5,400 per year.

Comparing that total against the full cost of the project gives a payback period. Every figure above is a placeholder. The purpose of the example is to show that after Layer 01 the calculation can be performed with the company's own measurements, before any money is committed to building.

The question that precedes the price

The useful question is not what the system costs. It is what the absence of it costs at present, and how much of that can be evidenced from the map. Where the second half of that question cannot be answered, the next step is Layer 01 rather than a costing.

08

CHAPTER EIGHT

Governance

Consolidation increases both capability and exposure. A distributed stack provides a form of accidental protection — no single system holds everything, and no single failure stops everything. Removing the fragmentation removes that protection, and the decisions it was substituting for have to be made explicitly.

Permissions

Once information sits together, the question of who may see the margin on a piece of work becomes practical rather than theoretical. Roles are defined alongside the data model in Layer 03, not afterwards. Permissions are attached to entities rather than to screens, because screens are replaced and entities are not.

Human approval

The arrangement is usually called a human in the loop, and the governing variable is the cost of an error. Where an error is cheap and reversible, the system acts alone. Where it is irreversible or reaches a third party — money leaving, a message to a client, a contractual commitment — a single approval precedes the effect. Approval should not be applied uniformly: a queue that accumulates faster than it is cleared stops being read, and becomes an automatic approval with additional steps.

Traceability

Every action an agent takes is recorded: what was read, what was written, when, and under which version of its instructions. This is not a compliance exercise. It is the difference between explaining an error in minutes and being unable to explain it, and the ability to explain is what preserves the team's willingness to rely on the system.

Sensitive data

Before any connection is made, the company decides which categories of information may not leave its infrastructure and which model providers are acceptable for each category. The decision has legal and contractual consequences and belongs in Layer 03, where the location of each entity is being defined, rather than after the system exists.

Continuity

With one system rather than several, an outage is total rather than partial. Two provisions are proportionate: backups that have been tested by performing a restoration, not merely configured; and a written manual procedure for the two or three processes that cannot wait a day.

> **PRINCIPLE**
>
> The team's confidence in the system is the most fragile asset in the project. It accumulates through months of correct behaviour and is spent by a single visible error that nobody can explain. Traceability exists so that the explanation is available.

09

CHAPTER NINE

What not to build

A significant part of the outcome is determined by what is excluded from scope. The following are the most expensive things to build and the reasons they are not worth building.

Accounting

Regulated, changed by legislation, and adequately solved by existing software. It is connected, not reproduced.

Email, calendar and chat

Their value is in an external network rather than in the software itself. They are integrated.

A configurable engine for a future requirement

The configurable version of any feature costs a multiple of the version that solves the present case, and is rarely configured afterwards. The present case is built; the second case is built when it exists.

A module for a process still under discussion

Where three people describe a process three different ways, it is not ready to be encoded. It stays in the existing tool until the disagreement is resolved.

Reports that were not requested

A report is built the second time someone asks for it. A dashboard built because it presents well has no reader, and its cost is invisible.

A mobile application, initially

Unless the operation is performed in the field, responsive web is sufficient until it is known precisely which few actions are performed from a phone.

10

CHAPTER TEN

The first week

Layer 01, together with the decision that follows it in Layer 02, is separable from the rest of the method and can be performed by the company alone. It produces a document that is useful whether or not anything is built afterwards, and no later layer can be performed without it.

DAY	ACTIVITY	OUTPUT
1	List every workflow by department, without detail. Schedule the week's sessions.	Workflow inventory and calendar
2	Walk the workflows of the largest or busiest department, beside the people performing them.	Detailed workflows with handoffs marked
3	Walk the remaining departments. Mark duplicate entry.	Detailed workflows and duplicate register
4	Estimate manual hours per workflow with the people spending them. Extract the tool inventory and its cost.	Measured hours and subscription statement
5	Rank workflows by hours. Sort each tool into absorb, keep or cancel. Execute the cancellations.	Priorities, decision table, first saving

THE ORDER, RESTATED

Map · Cut · Model · Build · Agents · Automate. Each layer consumes the output of the previous one. A project that begins at Layer 05 is not further ahead; it is building on a foundation that has not been established.

Whether a system of this kind remains distinguishing depends on how quickly systems like it become ordinary, which is not something this paper can predict. The mechanism does not depend on the prediction: the order works because each layer consumes the output of the one above it, and that holds regardless of how many other companies adopt it.

A

APPENDIX A

Templates

Four templates: one for each layer that produces a document, and one for the agent specification in Layer 05. They are stated as field lists so they can be reproduced in any tool.

A.1 · Workflow record `Layer 01`

FIELD	CONTENT
Workflow name	As the team refers to it, not as it should be named
Department and owner	Who performs it; who is accountable for it
Trigger	The precise event that begins it
Steps	Numbered, one per line, in performed order; per step, actor, tool, input and output
Tools touched	All of them, in order of use
Handoffs	Each point where person or tool changes
Duplicate entry	Which fact is typed twice, and where
Definition of done	The condition that ends it
Frequency	Occurrences per week or month
Manual hours per week	Estimated with the person spending them
Exceptions	Cases that break the normal path
Decision rules	Any judgement made, and the rule behind it
Human judgement	Steps that cannot be reduced to a rule, excluded from automation, with the reason

A.2 · Tool decision table Layer 02

TOOL	FUNCTION	COST / MONTH	DECISION	JUSTIFICATION	IF KEPT: AUTHORITATIVE SIDE AND DIRECTION
–	—	—	—	ABSORB	Value is that records are organised inside it
–	—	—	KEEP	Regulated, external network, or rebuild exceeds project	Which system owns each shared field, and which way data moves
–	—	—	CANCEL	Unused or duplicated	—

A.3 · Entity record Layer 03

FIELD	CONTENT
Entity	The noun, singular, in the team’s vocabulary
Identifier	Stable, never reused, never displayed as though it carried meaning
Definition	One line: what it is and what it is not
Attributes	Name, type, required, permitted values
Relationships	To which entities, and of what cardinality — how many of each side relate
Authoritative location	One place, stated explicitly
Lifecycle	Permitted states and permitted transitions
Access	Roles with read and with write
Retention	How long it is kept and what happens afterwards

A.4 · Agent specification `Layer 05`

FIELD	CONTENT
Job	One sentence. Two sentences indicates two agents
Input	What it receives, and from where
Output	What it produces, and where it is written
Data access	Named entities, with read or write
Model assignment	Tier, and the reason for that tier
Behaviour under uncertainty	The queue it routes to when it cannot resolve
Human approval	Whether, and at which point
Evaluation	Agreement metric and acceptable threshold
Parallel run	Duration, and where the retained comparison set is kept
Logging	What is recorded on each execution
Instruction version	Identifier recorded against every run

B

APPENDIX B

Glossary

Agent

A bounded software job that uses a language model to read, draft, classify or answer, with declared data access and, in some cases, permission to write to the system.

AI-native

Designed from the outset on the assumption that a language model is available at every step, as distinct from adding model-based features to a system designed before that assumption.

Anchor entity

An entity that most other entities attach to, typically the client and the unit of work. Identifying them is the substance of Layer 03.

Context window

The quantity of information a model can consider in a single operation. It is the reason access to organised data determines usefulness more than model size does.

Data model

The set of entities, their attributes and their relationships.

Entity

A noun the business operates on, represented as an object in the database.

ERP

Enterprise resource planning software: an integrated system that supplies a model of business operation which the adopting company conforms to.

Frontier model

The most capable tier of language model available at a given time, and the most expensive to run. Contrasted with small and mid tiers in model routing.

Handoff

A point at which work passes between two people or two tools. Handoffs are where work waits and where information is re-entered.

Human in the loop

An explicit approval point at which a person confirms before an automatic action takes effect outside the company.

Idempotency

The property that performing an operation twice produces the same result as performing it once. Required of any automation that can be retried.

Loaded cost

The cost of an hour of someone's time including employment costs, rather than salary alone. Used in Chapter 7.

Model routing

Assigning each task to the least expensive model that performs it acceptably, rather than routing all tasks to the most capable one.

Single source of truth

The rule that each fact exists in exactly one location, which every other part of the system reads rather than copies.

COLOPHON

AGENT ZERO

Agent Zero publishes field papers on applied artificial intelligence: how systems are designed, what they are made of, how they fail, and what it costs to run them. Papers are published without a byline. The reasoning is intended to be checkable without reference to who wrote it.

Every quantity in this paper is illustrative. No client engagement is described and no performance, saving or adoption statistic is claimed. Where the text refers to how projects fail, it refers to failure modes that follow from the structure of the work.

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