

AI-Based Architecture In Practice

How knowledge-intensive organizations
transform core operations

through autonomous architecture

Comparative field study in software

engineering, banking and healthcare

Empirical Research

120-person SaaS · \$45B bank · Healthcare

5 layers · 5 levels · 3 cases · KPIs

Oliver Bodemer · e-Softworks, Inc.

September 2026 · Whitepaper

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The Principle

Organizations fail from
embedding AI without
architecture.

The pattern most companies follow:

1. Identify a bottleneck
2. Plug in an AI tool
3. Expect results

This is not architecture.

"Which bottleneck is expensive
enough to justify autonomy?"

89% of AI projects fail to scale

(Gartner 2024)

The Golden Rule

**Use AI where it helps the business.
Nowhere else by default.**

This is not an argument for embedding autonomous agents in every process. It is an argument for embedding them at identified operational bottlenecks with explicit decision rights, reversible actions, and continuous governance.

**"First-class" does not mean
"everywhere."**

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The Architecture



Bidirectionality is what makes this architecture, not a tool.

Data flows up. Governance flows down.

Critical: Layer 3 (Policy) and Layer 5 (Governance)

must be in place before Layer 2 (Model) is scaled.

Maturity Model

L1	Reactive Information
L2	Augmented Suggestion
L3	Automated Execution
L4	Adaptive Self-tuning
L5	Autonomous Operation

All 3 case studies reached Level 4

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Case Study A

120 employees · 18 engineers · SaaS

Bottleneck: Release velocity and regression cost

KPI	Before	After	Gain
Cycle time	18d	7d	61%
Defect rate	4.2	2.3	45%
Deployments	2/w	9/w	4.5×

Investment: \$850K over 18 months

Positive ROI within 18 months

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Case Study B

\$45B assets · 8,000 employees · US Bank

Bottleneck: Loan cycle time, AML noise, fraud detection

KPI	Before	After	Gain
Loan processing	21d	48h	~90%
AML false-positive	95%	65%	30pp
Fraud detection	<20%	85%	4.25×

Investment: \$2.45M over 18 months

Positive ROI within 18 months

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Case Study C

3,000 employees · 5 hospitals · \$25M IT budget

Bottleneck: Prior authorization, documentation burden, claims rejections

KPI	Before	After	Gain
Prior auth. time	3–5d	4–6h	88%
Claims rejection	12%	5%	58%
Doc. time, adopters	120m	45m	62%

Investment: \$65K · 12 months

Physician adoption: 40% · rose to 65% after co-design

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Counter-Intuitive Finding

Regulation slows adoption but increases eventual impact

Software

12 mo · 61%

cycle time

Banking

18 mo · 90%

cycle time

Healthcare

6 mo · co-design

adoption path

Regulatory documentation forced investments in data quality and model validation that improved AI performance.

**The more wasteful the legacy process,
the greater the improvement potential.**

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Before You Start, Answer These 4 Questions

1. Which problem, in days or currency?

What is the bottleneck's cost?

2. Which decisions may AI take alone?

Define the decision rights boundary.

3. How will you know in 90 days it helps?

Define the success signal upfront.

4. What is the way back if it does not?

Every autonomous action must be reversible.

Layer 3 (Decision & Policy) and Layer 5 (Observability & Governance)
must be in place before Layer 2 is scaled.

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Download the Full Whitepaper

AI-Based Architecture in Practice

A Comparative Analysis in Software, Banking,

and Healthcare

15 pages · 5 layers · 5 levels

3 cases · KPI framework

What bottleneck

would you tackle first?

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