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Future of engineering:
Why API implementation maturity matters for agentic AI adoption

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What is an agentic AI enterprise?

An agentic AI enterprise is an organization that integrates autonomous, decision-making AI agents into its core business processes, workflows and strategy. The *interconnected* environment of technologies, platforms, application program interfaces (APIs), data sources, governance frameworks and human stakeholders enable autonomous AI agents to perceive, decide and act on behalf of users or organizations—often across complex, dynamic and multidomain scenarios.

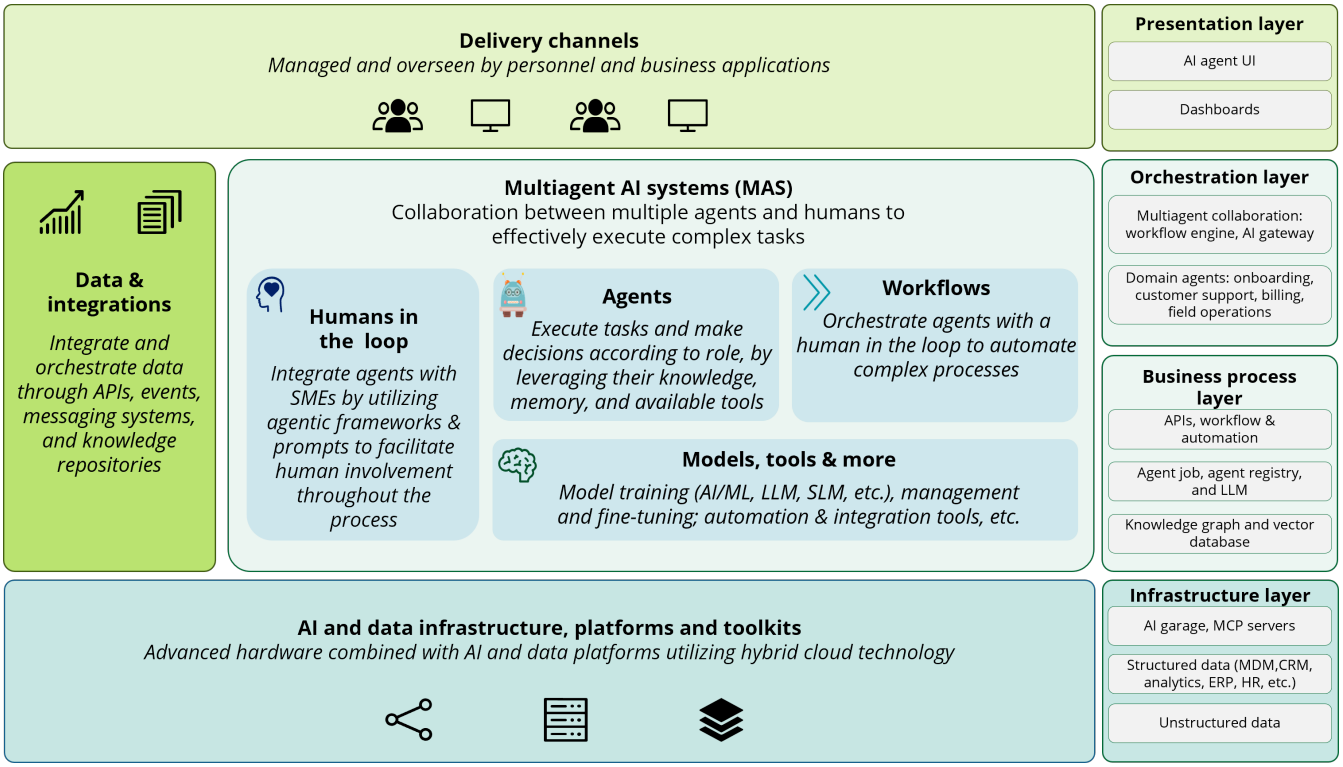

Figure 1: The agentic AI enterprise

Source: Deloitte

As depicted in Figure 1, the ideal agentic AI enterprise **can be** structured as follows:

1. **Delivery channels:** This top layer provides unified and AI-driven intelligent experiences for all customers, enabling customized and personalized user experiences.
2. **Data and integrations:** This capability provides a consistent and reliable method for connecting different systems and integrating data efficiently to enable broad analytics and insights.
3. **Multiagent AI systems:** A coordination layer where AI agents interact with each other and humans, leveraging workflows, models and human-in-the-loop mechanisms to complete complex tasks.
4. **AI and data infrastructure, platforms and toolkits:** The foundational layer consists of high-performance hardware, hybrid cloud platforms, and AI/data toolkits that support the entire ecosystem, providing simplified and consistent foundational services, and system health monitoring.

Key takeaways:

- Agentic AI drives autonomous, data-driven business operations.
- API maturity and security enable scalable AI integration.
- Unified data models help promote consistent, actionable decisions.
- Event-driven architecture delivers real-time, responsive insights.
- Human oversight sustains ethical and compliant AI systems.

Key pillars for agentic AI adoption

Agentic AI enterprise readiness heavily depends on key fundamental pillars—API implementation, data consistency, infrastructure maturity, confidentiality and privacy, observability and monitoring, and human-in-the-loop governance.

Agentic AI pillar	Description
API implementation maturity	A mature API ecosystem is foundational for agentic AI. This means having fully governed, self-describing, event-driven APIs with strong life cycle management and reusability. Mature APIs enable seamless integration, real-time data access, and secure, scalable automation—empowering AI agents to act autonomously and reliably across the enterprise system.
Data consistency	Agentic AI thrives on high-quality, consistent data. Canonical data models with strong semantics, lineage and master data management helps AI agents receive accurate, reliable information. This consistency is crucial for interoperability, compliance, and the ability to scale AI solutions across business domains.
Observability and monitoring	Real-time dashboards, automated alerting, and traceability of agent actions are vital. These capabilities allow for early detection of anomalies, continuous improvement, and assurance that AI agents are operating as intended.
Infrastructure readiness	A fully cloud-native, auto-scaled, and resilient infrastructure is essential. Real-time, intelligent workloads require platforms that can dynamically scale, recover from failures, and support the high demands of autonomous AI agents.
Confidentiality and privacy	Agentic AI is best positioned to operate within a zero-trust security framework, employing differential privacy and automated compliance mechanisms. Full auditability and robust access controls are nonnegotiable to protect sensitive data and ensure regulatory compliance.
Human-in-the-loop governance	Despite their autonomy, agentic AI systems ideally include clear escalation protocols and decision-review workflows. Human oversight provides accountability, ethical alignment, and the ability to intervene when necessary.

Agentic AI adoption should align with broader digital transformation goals, focusing on measurable business outcomes. Organizations are well served to map processes, identify pain points, and design systems where agents and humans collaborate effectively.

Why is API maturity necessary?

APIs are the integration fabric for digital business ecosystems and are critical for enabling automation, agentic AI and composable architectures.

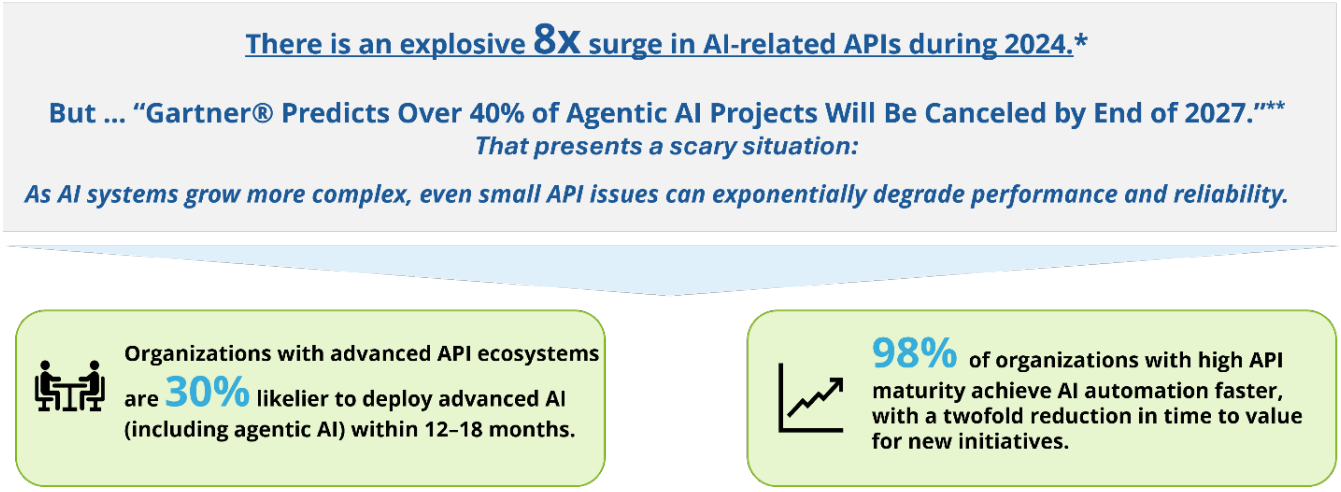

Figure 2: The surge in AI-related APIs

* J. Simpson, "Shift to AI Exploded API Usage in 2024," *Nordic APIS*, January 22, 2025.
** Gartner, Inc., "Gartner® Predicts Over 40% of Agentic AI Projects Will Be Canceled by End of 2027," press release, June 25, 2025.

API maturity is essential because it helps reliable automation, empowers agentic AI to act autonomously with secure and real-time data access, and enables flexible, scalable composable architecture. With standardized, interoperable and well-documented interfaces, organizations can accelerate AI adoption, reduce operational risks and unlock new business value—making API maturity a foundational pillar for agentic AI initiatives.

How API maturity accelerates agentic AI

API implementation maturity accelerates agentic AI solutions by providing reliable, secure and scalable data access, allowing AI agents to execute complex tasks with greater efficiency and accuracy.

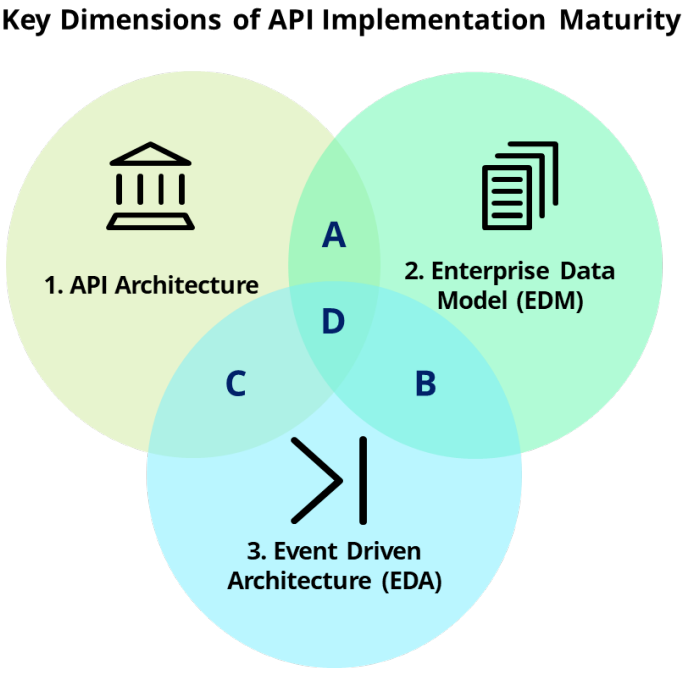

Figure 3: Key dimensions of API implementation maturity

Source: Deloitte

API implementation maturity has a significant impact on agentic AI:

- **Seamless integration and compatibility:** Standard APIs let agentic AI networks access varied data and services, improving autonomous decision-making through better interoperability.
- **Real-time event-driven capabilities:** Advanced APIs with event streaming and asynchronous functions let agentic AI quickly respond to real-time data and changing conditions.
- **Security and governance**: Robust APIs with strong authentication, authorization and monitoring keep agentic AI secure and compliant.
- **Accelerating innovation:** Mature APIs speed up AI prototyping and deployment, helping organizations remain agile in a rapidly changing tech environment.

How a three-layer architecture builds a solid foundation for agentic AI

A three-layer API architecture—comprising experience, process and system layers—builds the *flexible and governed* environment that agentic AI needs to operate safely and at scale. [When not designed in these three layers, API architectures often form a "distributed monolith"—individual APIs that are technically separate but functionally inseparable, and lead to scalability and maintainability challenges.] A three-layer API architecture is the leading practice in modern enterprise integration, especially when using Integration Platform as a Service (iPaaS) systems. It helps organize APIs into logical layers, promoting reusability, scalability and maintainability.

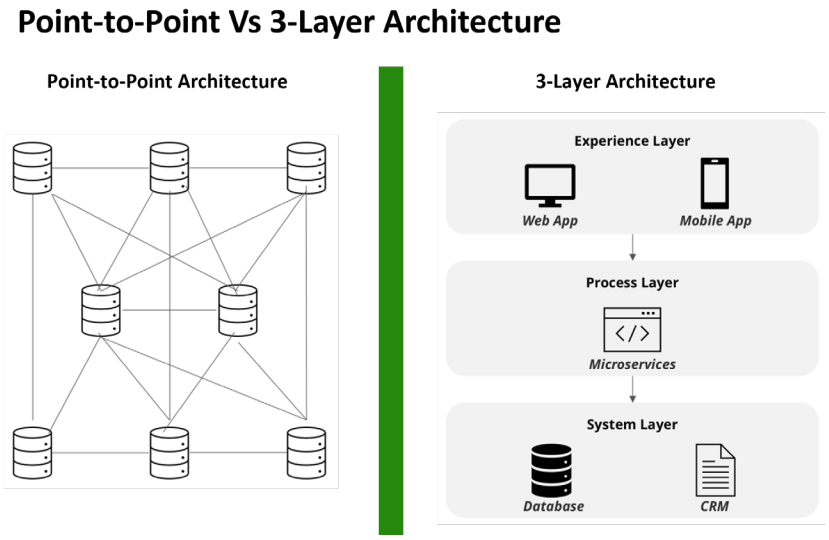

Figure 4: Point-to-point* vs. three-layer architectures**

* SIMPLUS, an Infosys company, "Admin, Data Integration, Latest News," September 17, 2020, accessed January 20, 2026.
** Deloitte, graphic representation based on Deloitte's industry knowledge and proprietary client experience.

Benefits of a three-layer API architecture

Three-layer API architectures support agentic AI in the enterprise in the following ways:

- **Separation of concerns for safe autonomy:** AI agents use layered controls: secure access, governed workflows and contextual experiences.
- **Scalability and flexibility:** Standardized APIs enable plug-and-play AI and rapid testing without disruption.
- **Governance, security and auditability:** Centralized APIs enforce policy, control access and help in compliant AI operation.
- **Reusability and consistency:** Shared APIs unify data access for AI agents, minimizing duplications and errors.
- **Accelerated innovation:** System and process APIs enable fast AI integration and composable automation.

Why your enterprise data model is crucial for AI success

An enterprise data model (EDM) is a unified, high-level blueprint of core data entities and relationships that provides a common language across the organization, enabling integration and minimizing data silos.

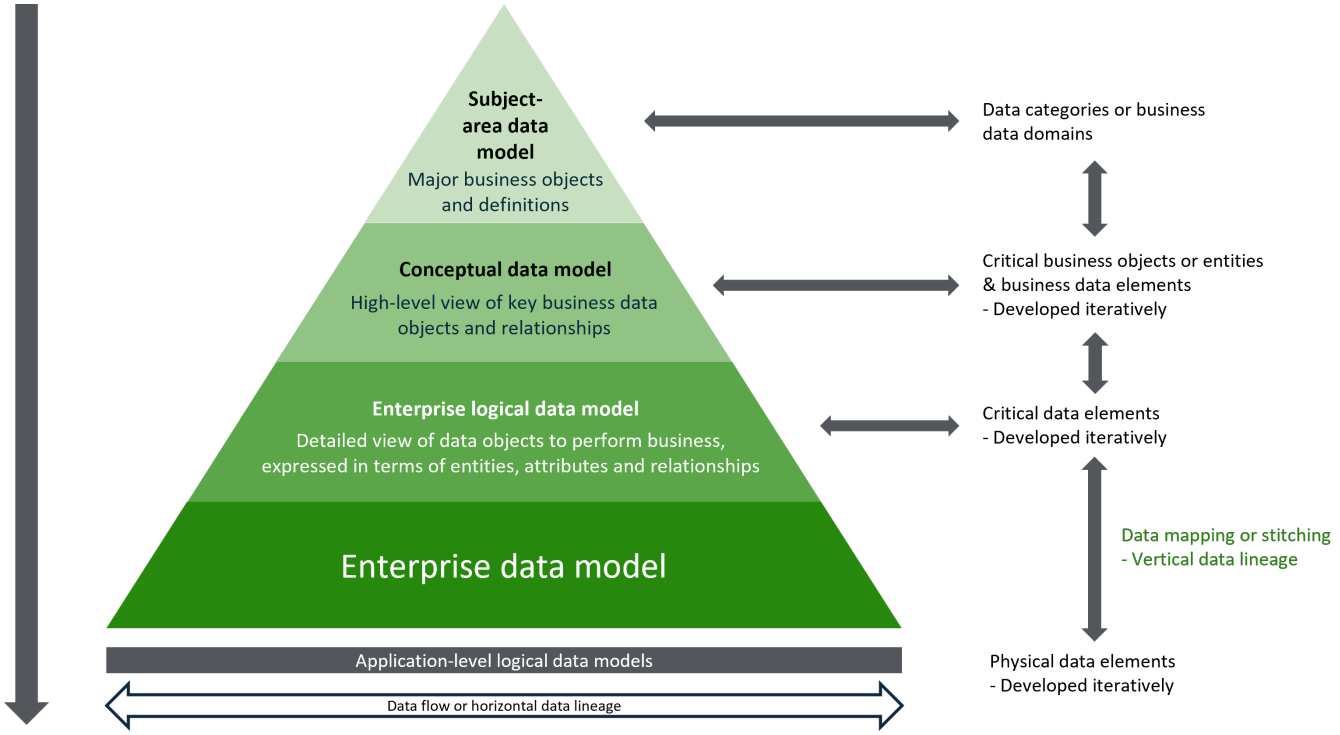

Figure 5: Enterprise data model hierarchy

Source: Deloitte

Benefits of APIs that leverage an EDM

APIs that leverage an EDM can provide significant help to agentic AI adoption in the enterprise:

- **Quality data for AI agents:** EDM-based APIs give AI agents consistent, validated data for accurate and efficient decisions.
- **Interoperability across systems:** Consistent and standardized data exchange enables seamless, reusable AI integration.
- **Accelerated AI development:** Stable, reusable data structures enable faster AI development and experimentation.
- **Enhanced governance:** Planned, focused oversight provides data traceability and consistent policy enforcement for compliant AI.
- **Scalability and adaptability:** Eliminating custom integrations and streamlining updates enables scalable, adaptable AI.

How event-driven architecture empowers agentic AI

Event-driven architecture (EDA) is a design paradigm in which system components communicate and react to events, rather than relying solely on direct, synchronous API calls. This approach is increasingly popular for building scalable, decoupled and real-time systems, especially in microservices and API-driven environments.

As research firm IDC summarized: "Agentic AI will require event-driven data architectures to continuously provide high-quality, relevant, and contextual data products to support the dynamic nature of agentic business activities."[1]

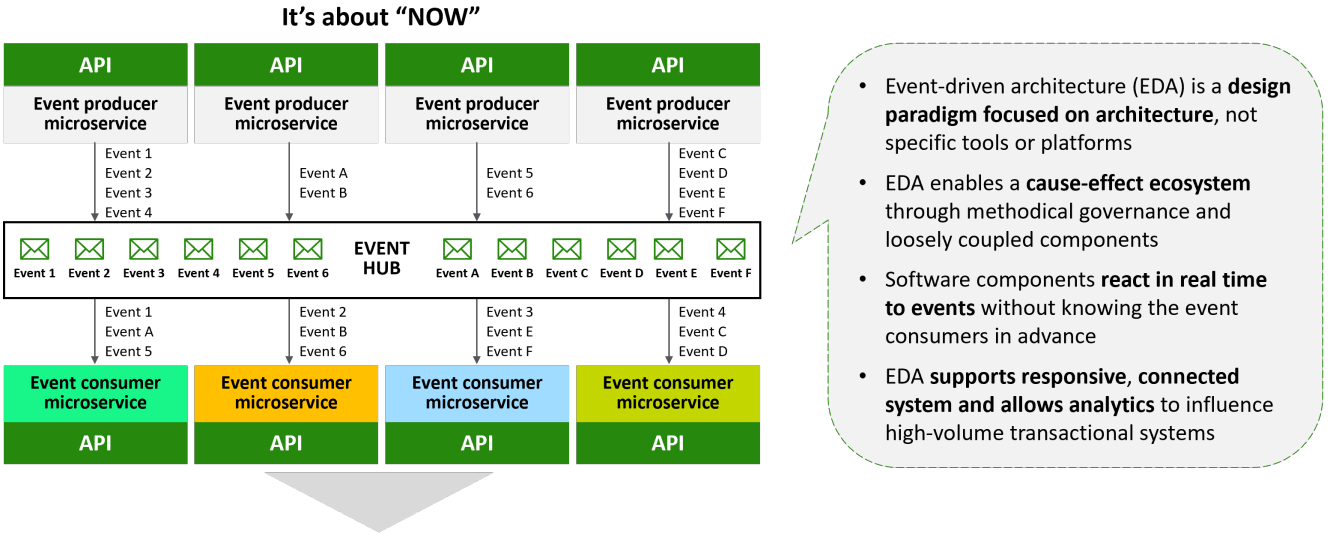

Figure 6: Event-driven architecture model

Source: Deloitte

Benefits of event-driven architecture

Event-driven architectures can provide foundational support for agentic AI in the enterprise through:

- **Reactivity:** Agentic AI systems can quickly respond to business events (e.g., transactions, customer interactions, system alerts) as they occur.
- **Decoupling:** AI agents are decoupled from the system generating the events to allow independent evolution and scaling.
- **Scalability:** Multiple AI agents can subscribe to the same event stream, each performing specialized tasks without interfering with one another.
- **Real-time insights:** Enables AI agents to process and act on data in real time, supporting proactive and autonomous decision-making.

Steps to accelerate agentic AI readiness

To accelerate readiness for agentic AI, organizations should cultivate their API and data maturity, establish governance frameworks, and gradually introduce event-driven capabilities. Realizing the full potential of agentic AI—autonomous systems capable of dynamic decision-making—enterprises can seamlessly integrate a robust API architecture, comprehensive data model and mature event-driven architecture.

Figure 7 illustrates a sample matrix for identifying agentic AI readiness based on the maturity of an enterprise's API architecture and its EDA and EDM implementations::

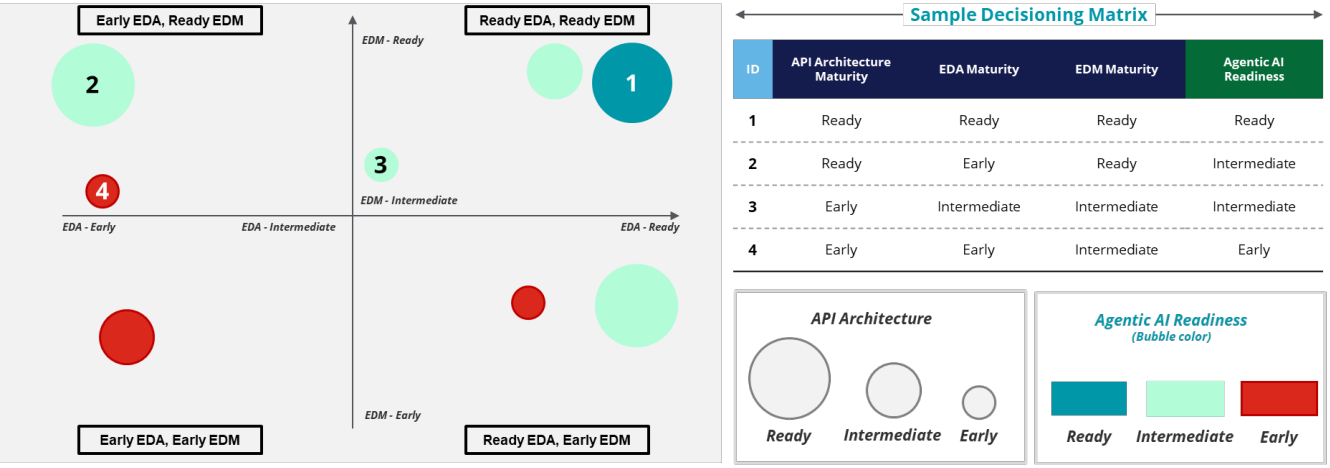

Figure 7: Matrix of agentic AI readiness

Source: Deloitte

The following table illustrates a sample API maturity and estimated timeframes for agentic AI adoption:

API maturity stage	Stage description	Estimated timeframe
Early	APIs are basic, siloed; limited automation; mostly internal use	18–30 months
Intermediate	APIs are standardized; some automation; partial governance; some external use	9–18 months

Source: Deloitte

In summary: Adopting event-driven architecture to drive competitive advantage

In our experience, establishing API implementation maturity has been a critical success factor for organizations looking to fully leverage agentic AI and large language models (LLMs). We've seen firsthand how prioritizing leading practices—such as implementing APIs with robust standards, adopting event-driven architectures, providing strong security, and building for scalability—empowers enterprises to unlock the true potential of autonomous AI solutions. This approach not only drives innovation and operational efficiency but also positions the organization to gain a competitive edge.

This article is part of Deloitte's Future of Engineering series, a collection of perspectives on how organizations are reimagining engineering to deliver impact at scale. Together, the series explores how leaders can combine AI and agentic ways of working with strong foundations—across architecture, talent, quality, and governance—to drive lasting business outcomes.

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End notes

1. Ritu Jyoti, Stewart Bond and others, *Agentic AI Impact on Enterprises: From the Tech Stack to the Future of Work and Services*, IDC Tech Buyer, April 2025, US53272524, gated.