Integration
Powered by AI

Capgemini

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AI-Driven Integration Evolution

As the pace of digital transformation accelerates, businesses are demanding faster, more scalable, and more intelligent solutions. Ignoring its potential is no longer an option.

We are witnessing a significant evolution in integration technologies to cater to these requirements. With Gen AI going mainstream and agentic AI on the horizon, the convergence of AI and integration marks a new chapter in software engineering. Our focus for this point of view is on how AI—especially Gen AI—will reshape integration across the Software Development Lifecycle (SDLC), from design and development to deployment and operations.

This convergence offers a powerful opportunity to create software systems that are more efficient, insightful, and adaptable. AI-assisted integration doesn't just automate processes - it elevates how integration teams operate, delivering meaningful transformation across the entire software engineering value chain.

To remain competitive and future-ready, organizations must embrace this shift and craft a strong AI-powered integration strategy. Those who master AI-assisted integration will position themselves for sustainable growth and long-term success.

Our previous publication, **Orchestrating Excellence with Business APIs and Application Integration**[1], explored how staying ahead of technological change—whether through cloud, big data, mobile, IoT, or AI—enables a seamless information flow across applications, partners, and devices. A strategic approach to integration is central to that vision.

Industry data backs this up. According to Gartner®[2] "by 2028, 75% of spend will be on software with generative AI (Gen AI) functionality, as emerging use cases unlock new efficiencies and capabilities in software solutions." Capgemini's own report, **Turbocharging Software with Gen AI**[3], found that 80% of organizations increased their Gen AI investments in the past year. Though adoption is still maturing, it's expected that by 2026, over 80% of software professionals will be leveraging Gen AI in their work.

Before diving deeper into the discussion, it's vital to emphasize the importance of a robust, modernized integration strategy. Research consistently shows a direct link between such a strategy and business performance. In Forrester's Developer Survey 2023[4], nearly twice as many respondents with a defined API strategy reported year-over-year revenue growth compared to those without one. Conversely, organizations lacking an integration strategy were almost twice as likely to report stagnant or declining revenue.

The message is clear: AI-powered integration is not just a technical shift—it's a strategic imperative. Now is the time to build that foundation and deploy at scale and adopt.

[1] Orchestrating Excellence with Business APIs and Application Integration

[2] Gartner, Forecast Analysis: GenAI Spending in Software Markets, Arunasree Cheparthi, Amarendra , et al., April 3, 2025 (Accessible to Gartner clients only)

[3] Capgemini Research Institute: Turbocharging software with Gen AI, 2024

[4] Forrester Developer Survey 2023

02

Convergence of AI and Integration Platforms

Integration Platform as a Service (iPaaS) platforms have always aimed to simplify the integration of disparate systems, applications, and data sources. However, integration platforms are undergoing a fundamental shift as AI and integration platforms converge to create intelligent, human assisted automation that adapts and learns from user interactions and system behaviors. This synergy has transformed iPaaS platforms into intelligent, adaptative and context-aware system that can intelligently map data, predict integration needs, and even augment the creation of code for integration flows. All based on historical data and user preferences. AI enables augmented custom integration solutions that need lesser human intervention. And reduce the need for extensive coding.

Harness tangible benefits of iPaaS powered by AI in integration software engineering

1. **Efficiency:** AI can auto-generate code for integration flows and thus minimizes the need for manual coding. AI can suggest optimal integration patterns based on historical data. AI can also accelerate testing and deployment with automated validations.
2. **Adaptability:** iPaaS powered by AI can learn from historical data and adapt in real-time to make integration flows more context aware. This could apply to business logic and schema structure in integration and offer context aware recommendations for the workflows.
3. **Scalability:** iPaaS powered by AI can enhance the scalability of integration platforms, businesses can grow without being bogged down by technical limitations. AI can dynamically scale platform resources based on throughput and processing workload and can optimize performance through continuous learning and feedback loops.
4. **Foster innovation:** The AI automation within Integration software engineering life cycle can free up Integration engineers and will allow them to focus on driving innovation.

Integration powered by AI isn't just about integration and API code creation. It's also about revolutionizing the integration software engineering lifecycle.

Integration Application Development & Support End-to-end Lifecycle		
	Activities	**Tools & Assets**
Discovery	• **Gap Analysis** • **Reverse Engineering** • **Platform Assessment**	**Capgemini Custom Assistant** for reverse Engineering documentation
Design	• **API Designs** • **Swagger Designs** • **Technical Designs**	AI powered iPaaS tools to assist in integration flow designs
Build	• **Code Generation** • **Code Reviews** • **Code Migration** • **Unit Test Case & Testing** • **Build Package Creation**	**Capgemini Asset for Code Migration** AI powered iPaaS to generate integration flows, data mappings & unit test cases
Test	• **Test Case Generation** • **Test Data Generation** • **Test Result Analysis**	**Capgemini's AI-powered Test Automation Tool** for tests cases, tests data sets, tests results creations
Release & Deploy	• **Platform Configuration & Provisioning** • **Sizing + Geo Distribution** • **Deployment**	**Capgemini's CI/CD** automation with dashboard
Operate & Monitor	• **Monitoring & Anomaly Detection** • **Incident Analysis & Resolution** • **Predictive Maintenance & Optimization**	AI tools for incident analysis & resolution AI tools for software observability with analysis

This transformation spans from identifying business demands to designing, coding, building, testing, releasing, deploying, operating, and monitoring integration workflows.

- From the start, in the **discovery phase**, AI can be leveraged for gap analysis, reverse engineering, and platform assessment.
- In turn, AI can accelerate the **design phase**, helping with API and integration flow designs and its documentation.
- In the **build phase**, AI helps in code generation and unit test case creation, ensuring higher quality output. Capgemini's migration assistant tool offers AI-powered automation for migrating integration on legacy platforms to new target platforms.
- In the **testing phase**, AI generates test cases, test data, and analyzes test results. This delivers a more thorough and efficient analysis, reducing the risk of errors and ensuring reliable integrations.
- When it comes to **deployment and operations**, AI plays a crucial role in platform configuration, provisioning, sizing, and geo-distribution. This enables smooth deployment, continuous monitoring, anomaly detection, and efficient incident analysis and resolution. Predictive maintenance and optimization further enhance operational efficiency.

03

Overcoming Key Challenges

The transformation journey to adopting AI-powered Integration presents its own set of unique challenges. Right across technical, financial, organizational, and ethical spheres. Unresolved, these issues can lead to project failures, delays, and quality issues. However, by taking a strategic approach, encompassing careful planning, investment, and governance you'll deliver a positive outcome.

> Adopting AI-powered integration is a game-changer—but it's not without its challenges.. From technical complexity to financial, organizational, and ethical considerations, the path requires thoughtful navigation. With a strategic approach grounded in planning, investment, and strong governance, organizations can overcome these hurdles and unlock meaningful, sustainable value."
>
> **Rahul Murudkar**
> Vice President | Global Offer & Practice Leader,
> Business APIs & Application Integration

Clear obstacles and prepare the ground

Transformation inevitably demands some groundwork. If your garden is going to be fruitful, you need to prepare and nourish the soil first. Likewise, any significant change in an organization will mean identifying and clearing obstacles in your way. You might have to change processes or prejudices. Configurations or expectations. But whatever the issues, solving them up front will take up fewer resources in the longer term.

Investment:

A primary hurdle is the significant investment required to deploy gen AI models at scale. This includes hardware, cloud resources, and ongoing maintenance. The return on investment can seem unclear. Especially if the project presents disconcertingly high implementation costs.

Our advice is to start small with pilot projects. Focus on AI usage in integration development and operations with clear benefits. Use cloud-based AI to reduce upfront costs and track incremental ROI. Partnering with experts ensures efficient deployment and long-term success.

Quality data:

You'll also need a vast amount of high-quality data to effectively train and fine-tune gen AI models. This data must be customized to align with specific integration and API requirements. Such as generating API configurations or workflow scripts.

Strategies like data standardization, synthetic data, and domain adaptation help streamline workflows, while human-in-the-loop feedback and federated learning reduce data dependency. Optimizing data collection around integration requirements ensures seamless integration and better performance.

Skepticism:

Skepticism from inside the organization can also slow down adoption. Especially when it comes to perceptions of the technical reliability of AI. Be quick to identify where technical teams may need specialized training to optimize AI in integration tasks. In turn, mistakes made by AI in generating integration flows, mappings, and orchestration can also result in integration errors.

Skepticism can be addressed with specialized training and transparent validation to boost confidence in AI reliability. Establish expert review checkpoints to catch integration errors early, ensuring smooth workflows and optimized performance.

Security and privacy:

Integration projects also face the challenge of security and privacy concerns related to AI output. These need careful monitoring and validation.

Use encryption, access controls, and audit logs to safeguard sensitive data while continuously reviewing AI-generated outputs for risks.

Training and support:

One key challenge is the risk of leveraging non-Integration SMEs in creating inefficient or error-prone Integration flows with AI-powered integration tools due to a lack of understanding of best practices or the underlying technical complexities. Without a strong grasp of data structures or integration logic, they may introduce issues like data mismatches, security vulnerabilities, or poor scalability.

Comprehensive training and support for integration SMEs will build their foundational understanding of integration principles. Implementing governance frameworks, such as reviewing and validating integrations, can help prevent errors and ensure security standards are met.

Establish checks and balances along the way

Appropriate investment in infrastructure is also crucial to ensure that computational resources, cloud platforms, and data pipelines are made ready for the demands of AI. It's a good idea to put in place continuous monitoring to track AI performance, detect issues early, and refine outputs. It's also essential to establish clear guardrails and a governance model to ensure ethical use. This will also mitigate risks related to data privacy and compliance. Finally, fostering collaboration between AI experts and integration specialists will help bridge knowledge gaps and ensure a smooth and successful implementation.

04

Planning for Success with Integration Powered by AI

The four key measures to make this happen: Planning is crucial before you start with AI-powered integration development lifecycle. A comprehensive plan will accelerate success and bring the right value to your business. Typically, your journey will follow these key stages:

1. Plan: Setting clear objectives

At the start of an AI-powered integration journey in an organization, it's crucial to set clear objectives and business goals. These might include improving operational efficiency, driving innovation, or improving productivity. Then it's critical to set up key performance indicators (KPIs) and metrics to measure your success.

2. Assessment: Choosing AI-powered iPaaS/API platforms and models

You'll need to evaluate the right iPaaS platforms or hyperscaler platforms along with large language models (LLMs) to meet your organization's requirements. You'll need to assess security and compliance standards with the software provider to ensure you meet the requirements. You'll also need a full understanding of pricing models. That is, whether a model based on usage, subscription, or other metrics is most cost-effective for you.

You'll also need to allocate the necessary resources, including budget, personnel, and technology, to support the implementation. You might consider partnering with vendors who specialize in AI-driven integration solutions to leverage their expertise and technology.

It's essential to create a blueprint that outlines the phases in which AI will be introduced into software engineering lifecycle, detailing timelines and the key outcomes you expect.

3. Foundation: Pilot the use of integration powered by AI delivery

It's often best to start with a pilot project to test the AI-assisted integration in a controlled environment. This can help in identifying potential issues early on. And make it more straightforward to change your approach and product usage. Conduct thorough testing to validate the functionality, performance, and security of the integration solutions built with AI-powered tooling.

In parallel, team members need to be trained to get maximum effect from AI-driven APIs and integration tools.

4. Implementation at scale: Use of AI to power the integration delivery lifecycle

Once you've built the foundation, you can start using the AI-powered integration tools in integration delivery. In parallel, team members also need to continue with continuous AI model training. This could mean updating or retraining AI models regularly to incorporate new data, user interactions, and evolving business needs. Continuous monitoring and measurement will ensure that the AI model delivers accurate and relevant outputs, especially in dynamic environments.

05

Realizing the Future Benefits of AI

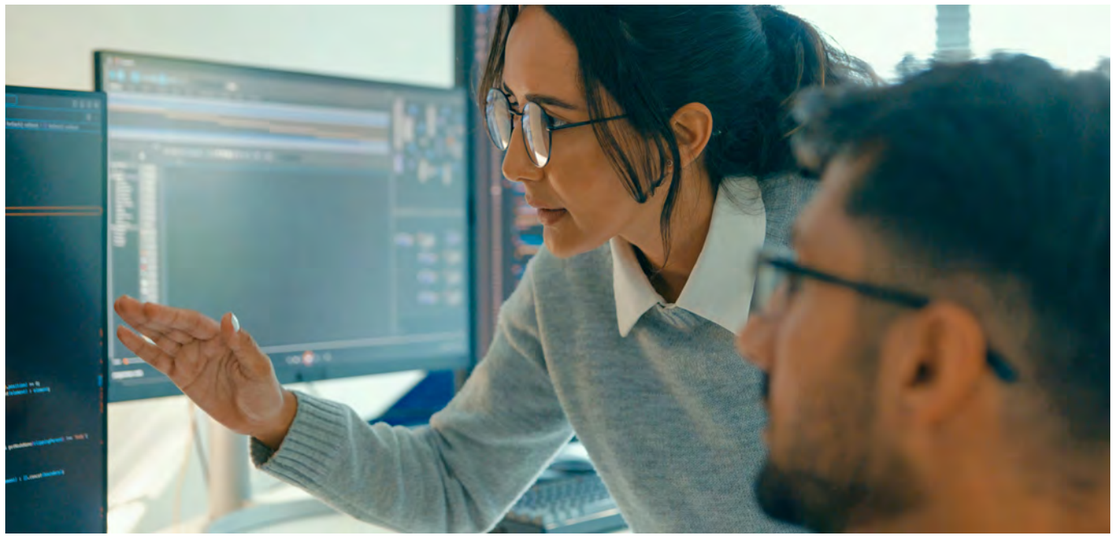
The future of AI-assisted integration is being rapidly transformed by the rise of **agentic systems**—autonomous, intelligent agents capable of perceiving context, making decisions, and acting with minimal human intervention. These agentic AIs go beyond conventional automation by enabling dynamic, real-time orchestration of systems, data flows, and business processes and driving autonomous operations i.e. IntegrationOps.

Key initiatives will include smart API management, AI-driven API development, self-healing APIs, data analytics, security, monitoring and logging, testing and validation, as well as compliance and governance.

- **Smart API management** will be a key area to benefit. AI will enable auto-tuning for traffic, monitor performance, and ensure security. As AI develops, organizations will benefit from the automatic generation of API policies for business process. In turn, this will drastically reduce the time and complexity involved in API development.
- The development of **self-healing APIs** will see AI monitoring APIs in real-time. It will predict potential failures and take corrective actions autonomously. The integration of AI-driven analytics services will offer predictive insights into API usage patterns. In turn, this will enable businesses to forecast demand, optimize pricing, and enhance customer experience.
- AI is also poised to play a critical role in **real-time threat detection** for APIs. Using machine learning, AI will identify anomalous behaviour, potential security breaches, or data leaks and automatically respond to mitigate risks.
- **API testing** will also be assisted by AI-driven testing tools. This will ensure reliability, while other services will ensure compliance with regulatory requirements and maintain data governance. Convergence will enable the creation of more efficient, secure, and intelligent systems.

Furthermore, **AI-based load balancing** will optimize resource allocation and manage traffic surges.

The future of AI-powered integration is bright, promising a state of continuous optimization and innovation. It's poised to transform how businesses build, deploy, and manage their systems. As AI capabilities continue to evolve, their integration into API and integration platforms will become more sophisticated. This will provide both developers and businesses with smarter, more autonomous tools designed to enhance and streamline workflows.



06

Effective by Design

At Capgemini, we believe in an ‘effective by design’ approach that emphasizes the importance of considered and careful planning. This ensures that APIs and integration solutions deliver maximum value, achieving desired outcomes and contributing to the overall success of the organization.

Our role is that of a guide. We collaborate with our clients, building coherent and cohesive teams that work together towards clear and defined goals.

From the start, we craft effective solutions by carefully considering how key enablers, such as cloud technology, AI, and automation, can be used to achieve long term goals. In the client’s own context. Our approach enables us to deliver a strong foundation, ensuring effective implementation, rapid delivery, and composability. We embrace complexity rather than avoid it. We empower organizations to discover hidden value and opportunities that might have been otherwise overlooked.

Our legacy has been built over 50 years, based on a heritage of learning from one experience after another, with new challenges driving our exceptional knowledge growth.

Orchestrating our expertise

We help our clients leverage AI at every stage of their transformation journey, through our business APIs and apps integration capabilities and solutions for enabling digital transformation, legacy modernization, and enterprise integration initiatives. Our solutions provide API and integration tailored specifically to sectors, including banking, public sector, retail, automotive, and telecoms.

Optimizing our strategic alliances

At Capgemini, we work closely with our clients to embrace AI to power APIs and apps integration through our strategic alliances with technology partners. By optimizing our strategic partnerships with iPaaS & API management technology vendors like Mulesoft, Boomi, IBM, Workato and Snaplogic, we orchestrate comprehensive AI based integration capabilities. We also leverage our strategic partnerships like AWS, Microsoft, and Google to harness the power of AI-based software engineering tools and solutions.

To learn about our business APIs and integration solutions for industries like public services, telecom, banking, automotive, and consumer products and retail, contact our experts.

For more reading on business APIs and application integration

Orchestrating excellence with business APIs and application integration
Business APIs and Application Integration - Capgemini

References

[1]Orchestrating Excellence with Business APIs and Application Integration

[2]Gartner, Forecast Analysis: GenAI Spending in Software Markets, Arunasree Cheparthi, Amarendra , et al., April 3, 2025 (Accessible to Gartner clients only)

[3]Capgemini Research Institute: Turbocharging software with Gen AI, 2024

[4]Forrester Developer Survey 2023

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Aldis leads the North America Integration Practice. His professional background spans over 40 years, during which he has advised on Digital, Cloud, and ERP initiatives, as well as supply chain transformation programs. He has established and operated multiple API Centres for Enablement and Integration Centres of Excellence, developed industry solutions, managed integration communities, and nurtured vendor alliances.

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About Capgemini

Capgemini is a global business and technology transformation partner, helping organizations to accelerate their dual transition to a digital and sustainable world, while creating tangible impact for enterprises and society. It is a responsible and diverse group of 340,000 team members in more than 50 countries. With its strong over 55-year heritage, Capgemini is trusted by its clients to unlock the value of technology to address the entire breadth of their business needs. It delivers end-to-end services and solutions leveraging strengths from strategy and design to engineering, all fueled by its market leading capabilities in AI, generative AI, cloud and data, combined with its deep industry expertise and partner ecosystem.
The Group reported 2024 global revenues of €22.1 billion.

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