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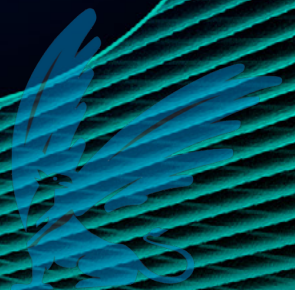
2025

Top Strategic Technology Trends

10



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Strategic technology trends are shaping the future by driving innovation while upholding ethical responsibility and trust

For CIOs and other senior IT leaders, the true measure of leadership lies in the ability to anticipate and prepare for the future — far beyond the immediate horizon. The 2025 Gartner Top Strategic Technology Trends serve as a vital star map for this journey, and the trends fall into three buckets:



AI imperatives and risks

The rise of AI agents will require advancements in AI governance and new technologies to combat disinformation.



New frontiers of computing

Quantum computing will require new cryptographic methods, while low-cost sensors will enable innovative business models.



Human-machine synergy

Prepare for enhanced interactions between physical and virtual experiences, robots integrating into daily life, and technologies that directly influence cognition and performance.

As you delve into this guide, consider how these trends align with your organization's digital ambitions and how they can be integrated into your strategic planning to drive long-term success.



Gene Alvarez
Distinguished VP Analyst, Gartner



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2025 Gartner Top 10 Strategic Technology Trends

Gartner carefully selected these 10 trends based on their potential to disrupt traditional business models, enable new forms of innovation and address the most pressing challenges facing enterprises today.

They represent strategic imperatives that require thoughtful consideration and decisive action.



AI imperatives and risks

- Agentic AI
- AI Governance Platforms
- Disinformation Security



New frontiers of computing

- Post-Quantum Cryptography
- Ambient Invisible Intelligence
- Energy-Efficient Computing
- Hybrid Computing



Human-machine synergy

- Spatial Computing
- Polyfunctional Robots
- Neurological Enhancement



What to know about the Top 10 Strategic Technology Trends

Learn more about each trend and its use
cases today and tomorrow.



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1 Agentic AI

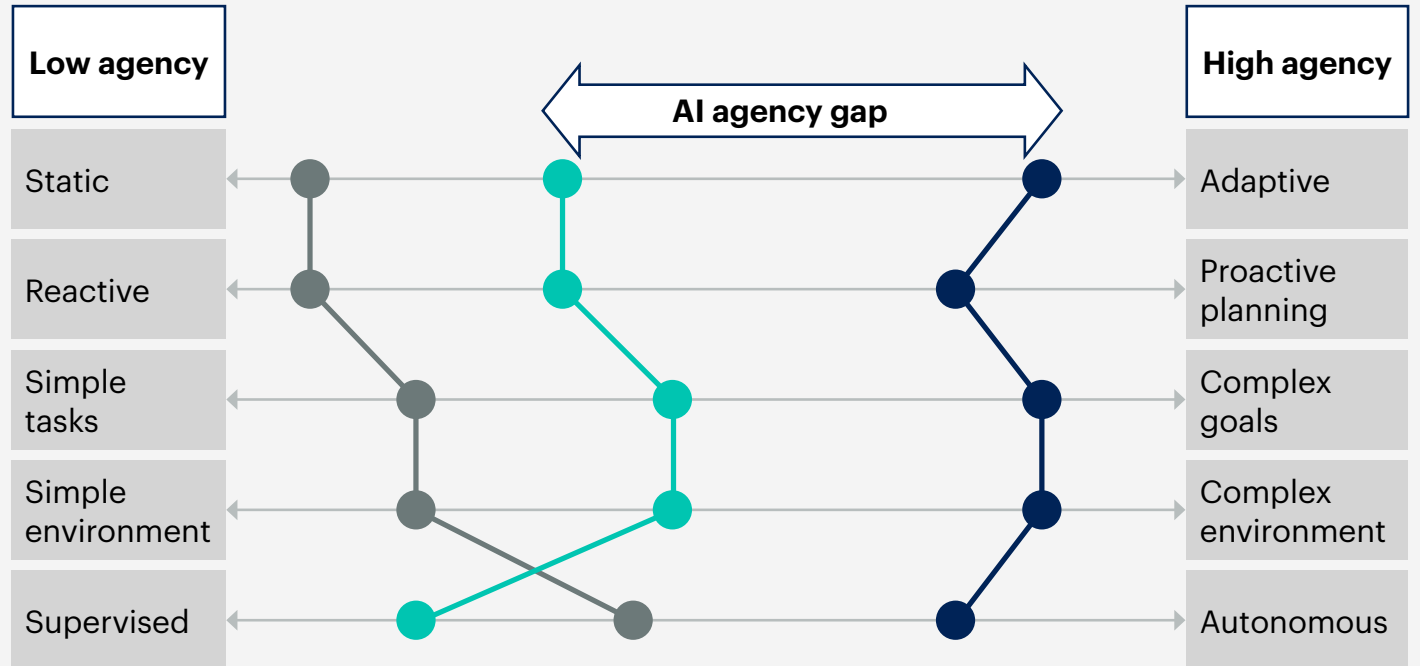
Agentic AI refers to software programs that are designed to independently make decisions and take actions to achieve specific goals.

These programs combine various AI techniques with features like memory, planning, sensing the environment, using tools and following safety guidelines to carry out tasks to reach objectives on their own.

For more on how it works and how to get started, read: [“What Is Agentic AI?”](#)

Mind the AI Agency Gap

● Human agency ● Deterministic chatbots ● LLM-based assistants



Source: Gartner



Agentic AI

Gartner predicts

By 2028, at least 15% of day-to-day work decisions will be made autonomously through agentic AI, up from 0% in 2024.

Source: Gartner

Why trending?

Agentic AI's ability to take action autonomously or semiautonomously has the potential to help CIOs realize their vision for generative AI to increase productivity across the organization.

Use cases

- Empowering workers to develop and manage more complicated, technical projects — whether microautomations or larger projects — through natural language
- Automating customer experiences by using data analysis to make highly calculated decisions at each step
- Changing decision making and improving situational awareness in organizations through quicker data analysis and prediction intelligence

”

Organizations have long wanted to promote high-performing teams, improve cross-functional collaboration and coordinate issues across team networks. Agentic AI has the potential to perform as a highly competent teammate by providing insights from derivative events that are often not visible to human teammates.



Tom Coshow
Senior Director Analyst, Gartner



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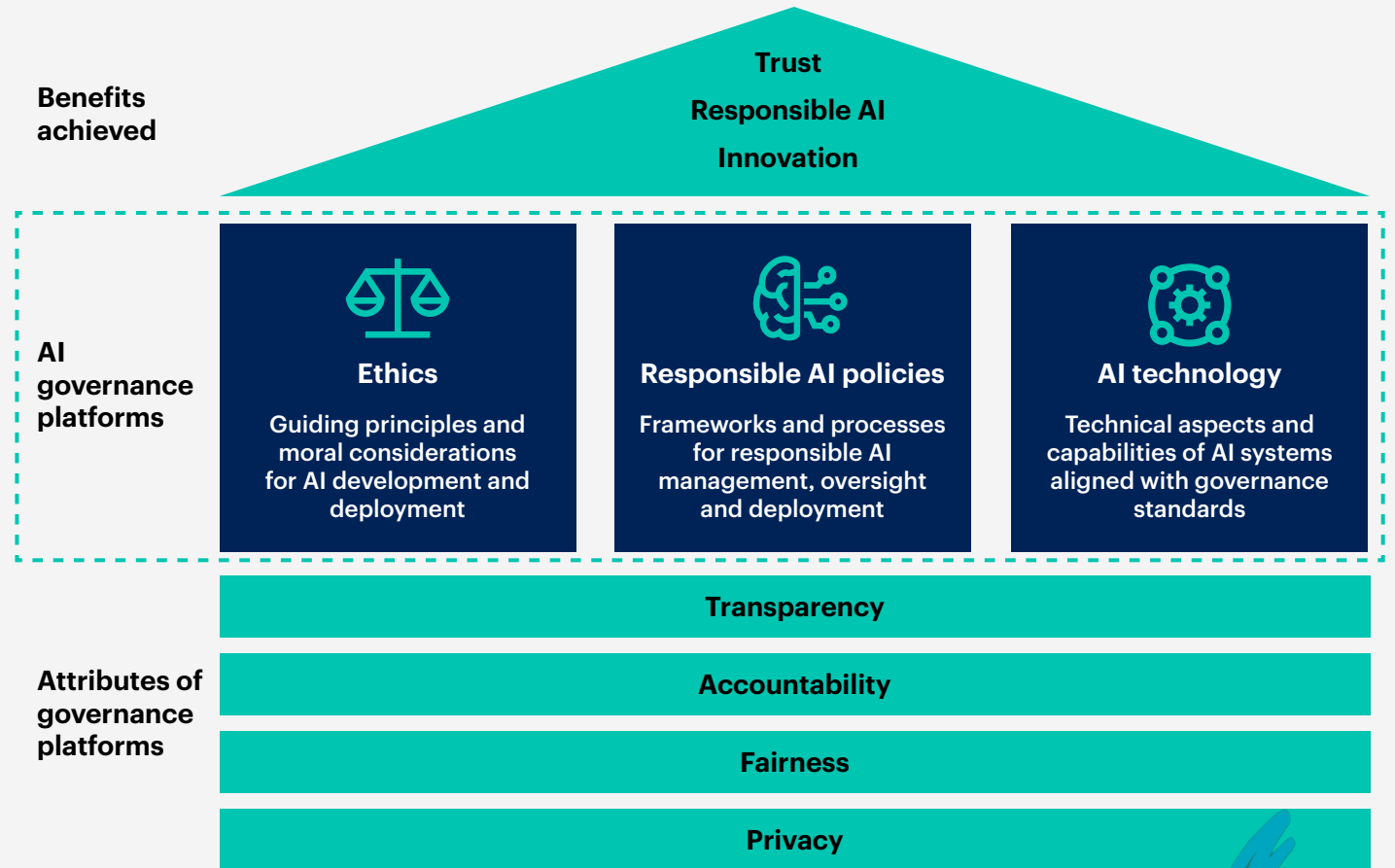
AI Governance Platforms

AI governance platforms help manage and control AI systems by ensuring they are used responsibly and ethically.

They allow IT leaders to make sure AI is reliable, transparent, fair and accountable while also meeting safety and ethical standards. This ensures that AI aligns with the organization's values and broader societal expectations.

For more on how it works and how to get started, read: ["What Are AI Governance Platforms?"](#)

AI Governance Platforms Elements



Source: Gartner



AI Governance Platforms

Gartner predicts

By 2028, enterprises using AI governance platforms will achieve 30% higher customer trust ratings and 25% better regulatory compliance scores than their competitors.

Source: Gartner

Why trending?

AI is being used in more areas, especially in industries with strict regulations. As AI spreads, so do risks like bias, privacy issues and the need to align with human values. It's crucial to ensure AI doesn't harm certain groups, manipulate markets or control important systems.

Use cases

- Assessing potential risks and harms that AI systems may pose, such as bias, privacy violations and negative societal impacts
- Guiding AI models through the model governance process to ensure all appropriate gates and controls are followed during the model life cycle
- Tracking usage, monitoring AI system performance, auditing decision-making processes and ensuring AI systems remain aligned with governance standards over time

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When you use a bank's mobile app or website, AI is often behind features like fraud detection, loan approvals and personalized finance advice. An AI governance platform helps the bank ensure these systems are making decisions fairly and ethically, protecting data and complying with regulations.



Jasleen Kaur Sindhu
VP Analyst, Gartner



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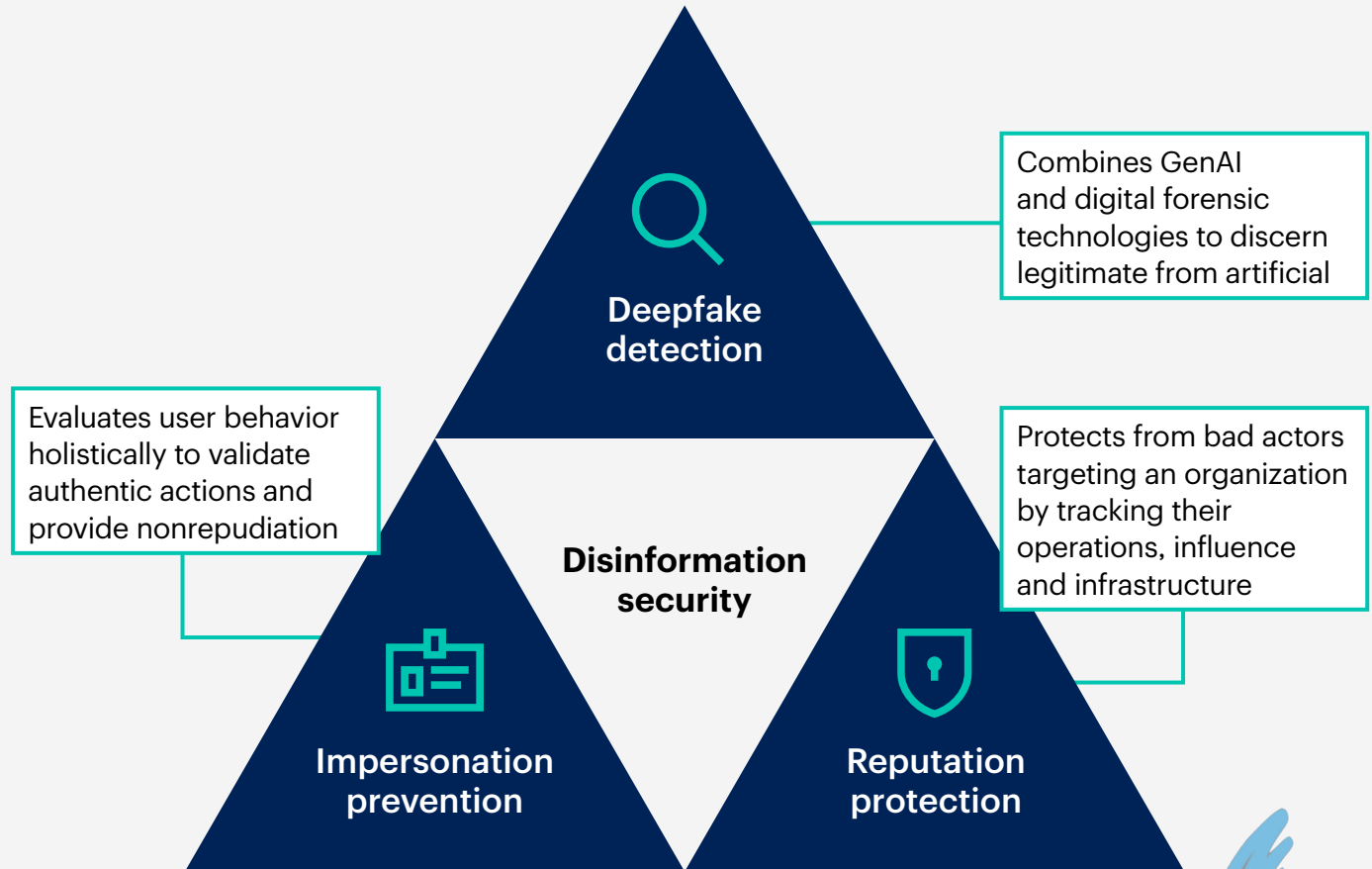
Disinformation Security

Disinformation security is designed to help identify what can be trusted.

The goal is to create systems that ensure information is accurate, verify authenticity, prevent impersonation and monitor the spread of harmful content.

For more on how it works and how to get started, read: [“What Is Disinformation Security?”](#)

What Is Disinformation Security?



Source: Gartner



Disinformation Security

Gartner predicts

By 2028, 50% of enterprises will adopt products, services or features specifically to address disinformation security use cases, up from less than 5% in 2024.

Source: Gartner

Why trending?

Disinformation is a digital arms race: Phishing, hacktivism, fake news and social engineering are all being turbocharged by adversaries intent on sowing fear, spreading havoc and committing fraud. As AI and machine learning tools become more advanced and accessible, disinformation targeting enterprises is expected to rise, posing significant and lasting risks if left unchecked.

Use cases

- Detecting use of synthetic media in authorized contexts (identifying verification, real-time communications or claims validation)
- Intelligence monitoring for narratives spread through mass or social media, such as those targeting an executive leadership team, products, services or brand
- Preventing the impersonation of individuals doing business with an organization, such as employees, contractors, suppliers and customers

”

Suppose an employee receives an email that appears to be from your company's CEO, requesting sensitive information or authorizing a financial transaction. Disinformation security tools would analyze the email's content, metadata and origin to detect signs of impersonation or fraud, and if need be, automatically quarantine the email, alert the employee and notify IT security.



Dan Ayoub
Senior Director Analyst, Gartner

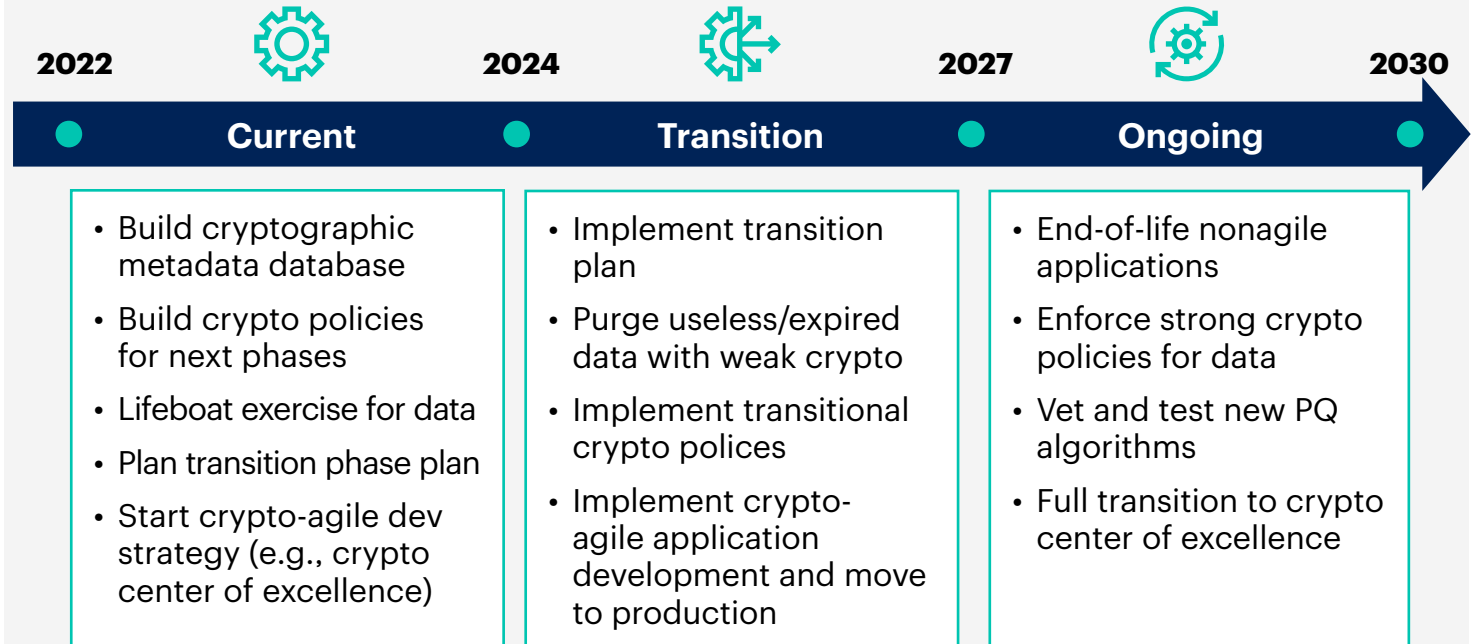


4 Post-Quantum Cryptography

Post-quantum cryptography (PQC) refers to cryptographic methods designed to be secure against the potential threats posed by quantum computers.

For more on how it works and how to get started, read: [“What Is Post-Quantum Cryptography?”](#)

Crypto-Agility Timeline



Source: Gartner



Post-Quantum Cryptography

Gartner predicts

By 2029, advances in quantum computing will make most conventional asymmetric cryptography unsafe to use.

Source: Gartner

Why trending?

Quantum computing will soon become a reality, potentially within this decade, and is expected to render many conventional cryptographic methods obsolete, posing a significant risk to data security. Criminals are already anticipating this shift, adopting strategies like “harvest now, decrypt later,” where they exfiltrate encrypted data with the expectation that they will eventually be able to decrypt it using quantum technology. This emerging threat has accelerated the need to prepare for PQC, which offers protection against quantum decryption.

Use cases

- Future-proofing your systems to ensure that sensitive financial data remains secure even in a quantum computing world
- Safeguarding valuable intellectual property from cyberthreats, including future quantum attacks, ensuring competitors or hackers cannot decrypt confidential information
- Ensuring encrypted messages, contracts and operational data cannot be intercepted or decrypted by quantum-powered adversaries

”

When employees send sensitive emails containing financial data, customer information or intellectual property, PQC algorithms could be applied to encrypt these communications. Even if attackers intercept the data now, they won't be able to decrypt it in the future, even when quantum computers become powerful enough to break current encryption standards.



Mark Horvath
VP Analyst, Gartner



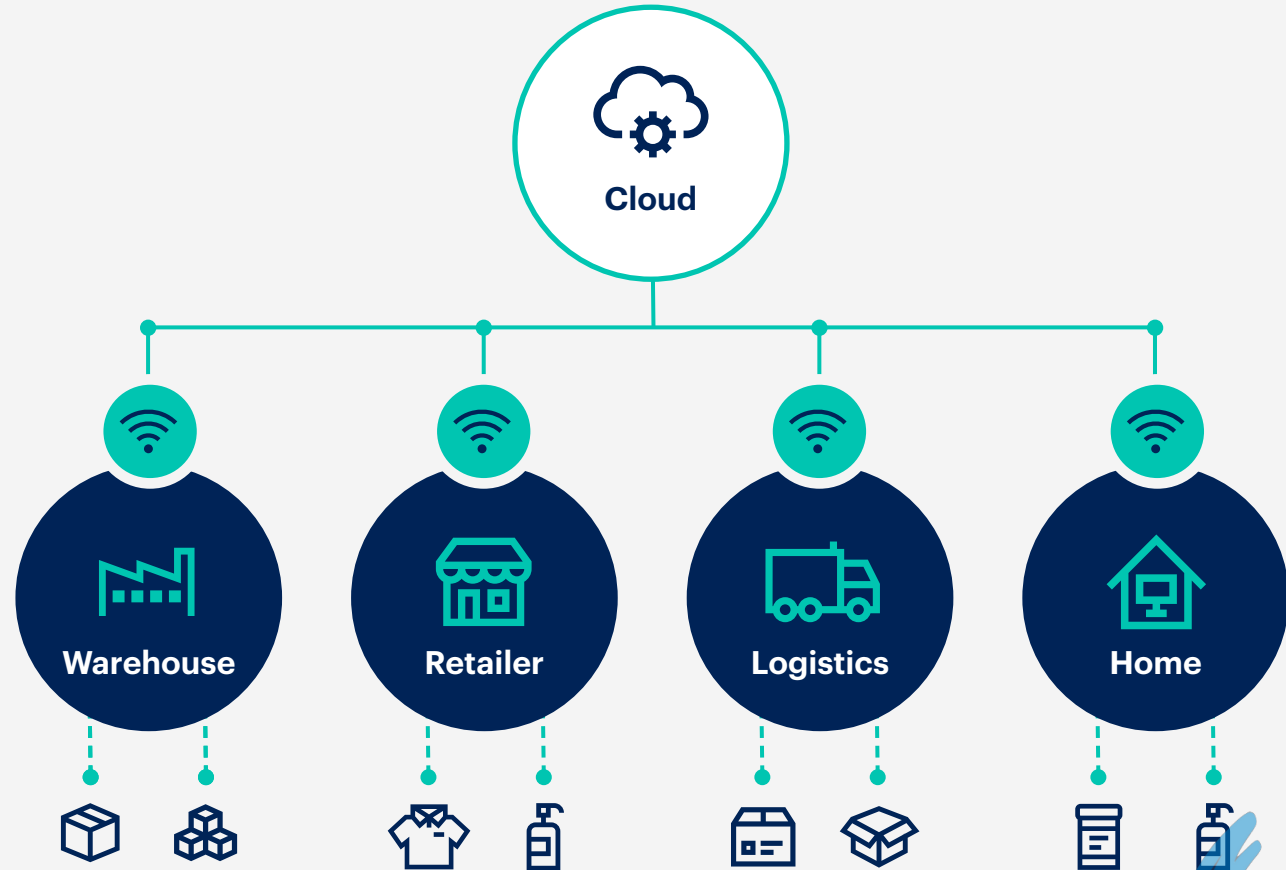
5 Ambient Invisible Intelligence

Ambient invisible intelligence refers to the widespread use of small, low-cost tags and sensors to track the location and status of various objects and environments.

This information is sent to the cloud for analysis and record keeping. These technologies will be built into everyday objects, often without the user noticing them.

For more on how it works and how to get started, read: [“What Is Ambient Invisible Intelligence?”](#)

Examples of Ambient Invisible Intelligence



Source: Gartner



Ambient Invisible Intelligence

Gartner predicts

Through 2028, early examples of ambient invisible intelligence will focus on solving immediate problems by enabling low-cost tracking and sensing of items, reducing cost or improving efficiency.

Source: Gartner

Why trending?

The technology for low-cost tags and sensors has become more affordable, making it economically attractive. It offers real-time visibility, which is valuable to organizations and supply chains — and could expand into broader ecosystems over time. Advances in wireless standards like Bluetooth and cellular networks, as well as emerging technologies like backscatter and printed electronics, will support new use cases. This intelligence will also become a key data source for AI and analytics, improving products and processes.

Use cases

- In a retail environment, automatically adjusting lighting, music and product recommendations based on customer behavior
- Monitoring how employees use office spaces and adjusting environmental factors automatically
- In healthcare, continuously monitoring patients without requiring wearable devices, enabling real-time responses to emergencies

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In manufacturing, components and machinery could communicate with management systems, providing updates on maintenance needs, stock levels or usage patterns. This visibility helps optimize supply chains, prevent equipment downtime and automate reordering.



Nick Jones

Distinguished VP Analyst, Gartner





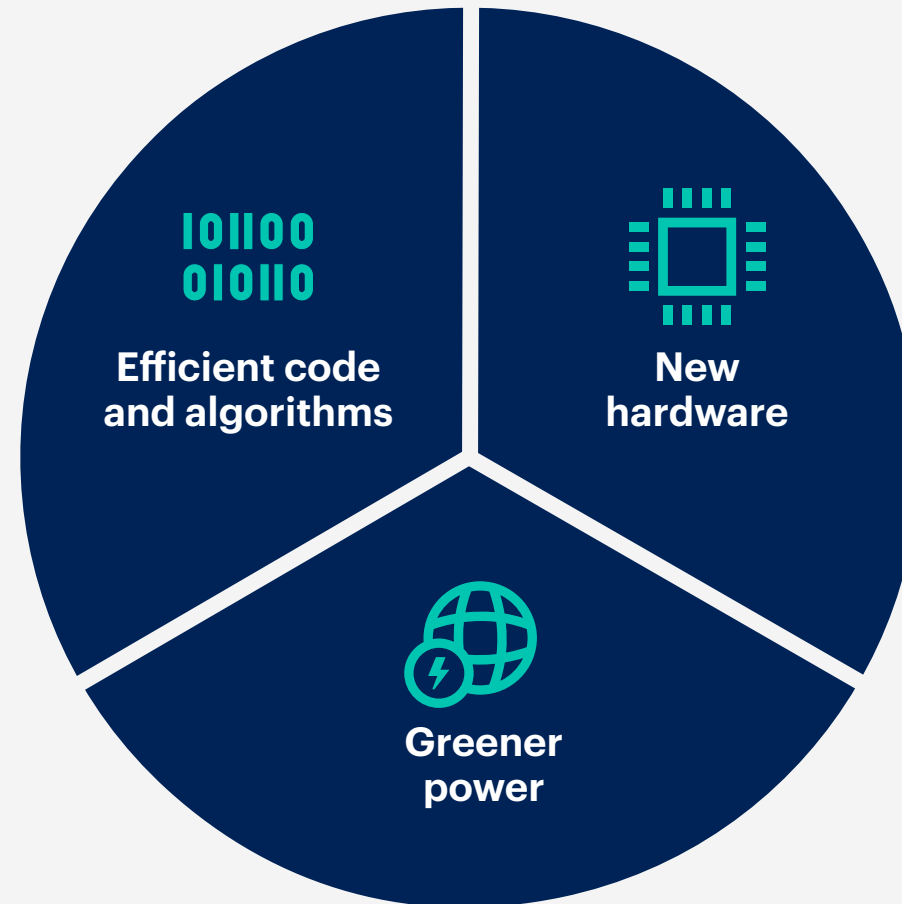
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Energy-Efficient Computing

Energy-efficient computing refers to designing and operating computers, data centers and other digital systems in ways that minimize energy consumption and carbon footprint.

For more on how it works and how to get started, read: [“What Is Energy-Efficient Computing?”](#)

Controlling the Sustainability of IT



Source: Gartner



Energy-Efficient Computing

Gartner predicts

The leading consideration for most IT organizations today is their carbon footprint.

Source: Gartner

Why trending?

Sustainability is now a board-level focus. IT significantly contributes to environmental footprints, especially in industries like financial services and IT services, as energy-intensive technologies like AI drive higher energy consumption. While conventional processing improvements are reaching their limits, new computing technologies, such as graphics processing units (GPUs), neuromorphic computing and quantum computing, are expected to deliver the substantial energy-efficiency gains needed in the next five to 10 years.

Use cases

- Cutting data center costs by reducing the power consumption of servers and cooling systems
- Sustainable product development: using energy-efficient computing to design products that consume less energy
- Using smart power management systems, reducing power consumption across office networks

”

Imagine a smart office building where energy-efficient computing is integrated into every aspect of daily operations. IoT sensors track occupancy, adjusting lighting, HVAC and equipment usage in real time based on actual needs — resulting in significant cost savings and reduction in carbon footprint.



Nick Jones
Distinguished VP Analyst, Gartner





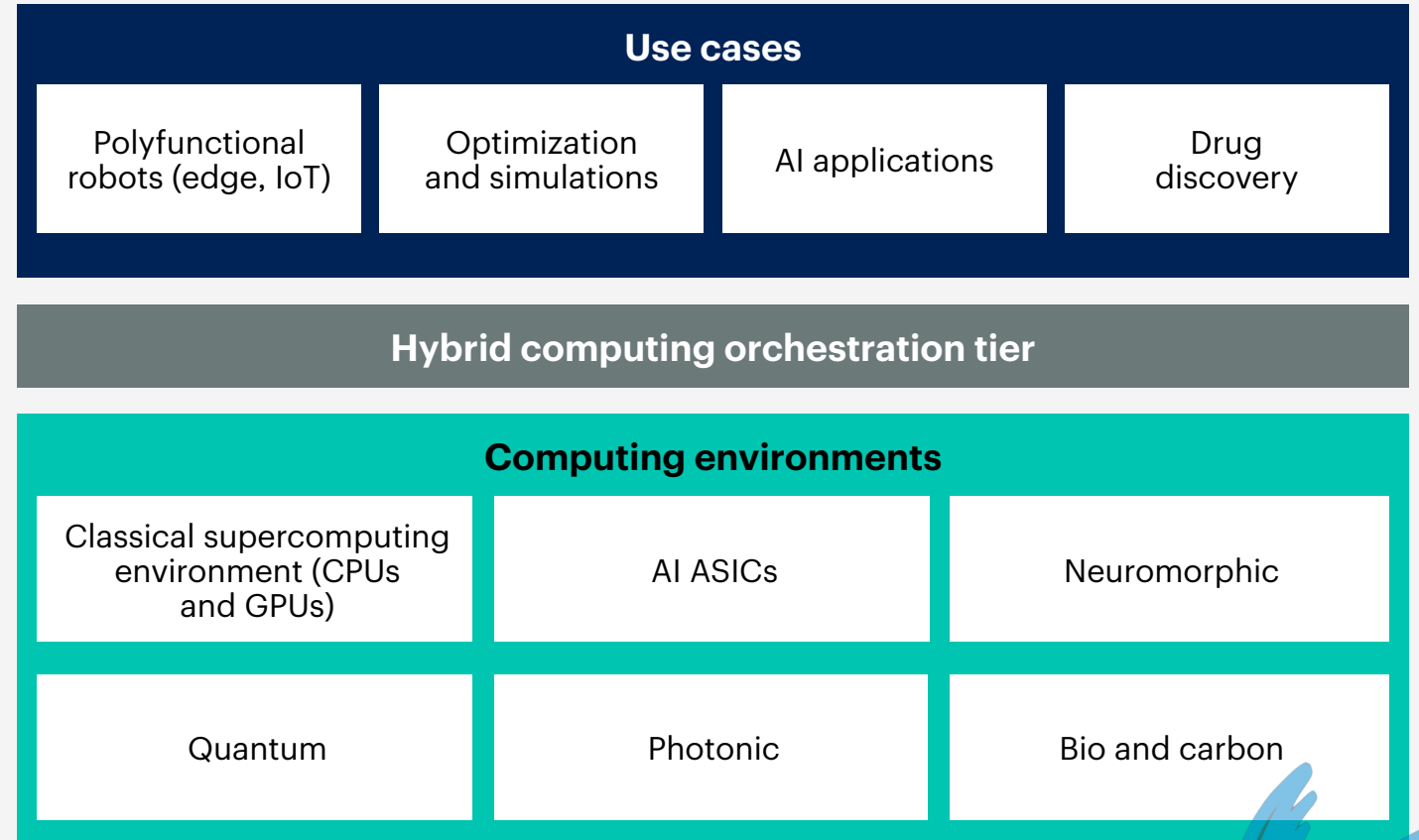
7 Hybrid Computing

Hybrid computing combines various technologies — such as CPUs, GPUs, edge devices, ASICs, and neuromorphic, quantum and photonic systems — to solve complex computational problems.

It creates a hybrid environment that uses the strengths of each technology.

For more on how it works and how to get started, read: [“What Is Hybrid Computing?”](#)

A Simplified Hybrid Computing Architecture



Source: Gartner



Hybrid Computing

Why trending?

Hybrid computing enables businesses to harness new technologies like photonic, biocomputing, neuromorphic and quantum systems for disruptive impact. GenAI is a key example, where solving complex problems requires advanced computing, networking and storage on a large scale.

Use cases

- Cost-efficient scalability: keeping critical workloads in-house for security reasons, while using the cloud to handle peak loads during busy seasons
- Enhancing data security and compliance: storing sensitive data on-premises, meeting strict data privacy regulations, while using the cloud for less sensitive operations or analytics
- Accelerating innovation and development: leveraging cloud-based development tools, while maintaining secure, on-premises environments for production

”

Picture this: An organization might run its core, sensitive applications on local servers (for security and control), while leveraging the cloud for high-performance tasks like data analytics, AI or backup storage. This hybrid setup enables the business to scale efficiently, optimize costs and maintain flexibility.



Soyeb Barot
VP Analyst, Gartner



8 Spatial Computing

Spatial computing augments the physical world by “anchoring” digital content in the real world, enabling users to interact with it in an immersive, realistic and intuitive experience.

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For more on how it works and how to get started, read: [“What Is Spatial Computing?”](#)

3 Layers Enabling Spatial Computing



Infrastructure

Supports convergence of multiple technologies and experiences, including hardware; a ubiquitous, fast and reliable network; and operating systems to support the creation and consumption of spatial computing services

Information

Contains the data used to facilitate the digital representation of the physical world and how, where and what data will be overlayed to it

Interaction

Facilitates how users will engage and intuitively experience digital objects in the physical world

Source: Gartner



Spatial Computing

Gartner predicts

By 2028, 20% of people will have an immersive experience with persistently anchored, geoposed content once a week, up from less than 1% in 2023.

Source: Gartner

Why trending?

Spatial computing is trending due to advances in augmented reality (AR), mixed reality (MR) and AI technologies, enabling immersive digital environments across gaming, healthcare and e-commerce. The proliferation of 5G and new devices like Apple Vision Pro and Meta Quest 3 are driving consumer demand and opening opportunities for new business models. With major companies like Nvidia and Qualcomm building ecosystems, the market is projected to grow from \$110 billion in 2023 to \$1.7 trillion by 2033.

Use cases

- Collaborating with your team in immersive 3D environments, making remote meetings more interactive and effective
- Creating lifelike simulations for employee trainings to emulate hands-on learning, reducing training costs and risks while improving skill acquisition and retention
- Navigating stores/purchasing decisions with an interactive virtual assistant to improve the shopping experience, driving higher engagement and sales

”

Using spatial computing, companies can use digital twin technology to create a real-time 3D digital replica of physical assets. This is an immersive way to monitor and optimize performance, predict maintenance needs and test scenarios without disrupting everyday operations.



Marty Resnick
VP Analyst, Gartner



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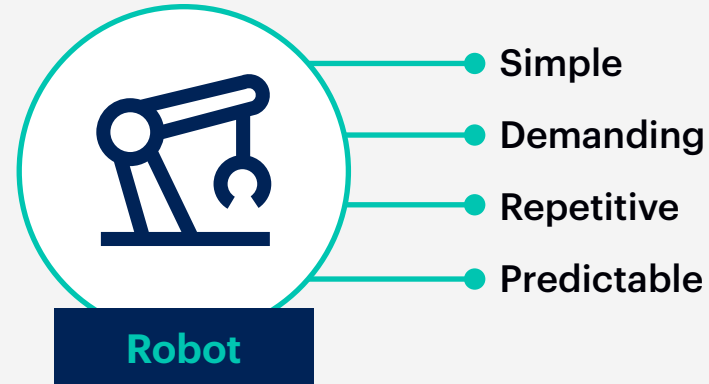
Polyfunctional Robots

Polyfunctional robots are machines that can perform multiple tasks, following human instruction or example.

They are flexible in both design and how they operate.

For more on how it works and how to get started, read: [“What Are Polyfunctional Robots?”](#)

Polyfunctional Robots: A New Wave of Physical Innovation



Source: Gartner



Polyfunctional Robots

Gartner predicts

By 2030, 80% of humans will engage with smart robots on a daily basis, up from less than 10% today.

Source: Gartner

Why trending?

Polyfunctional robots are trending due to rising labor costs and the demand for improved ROI in industries like warehousing and manufacturing. Vendors are driving media attention with competitive price points, making advanced robotics more accessible. While there is a wide range of pricing and capabilities, early adopters are exploring the potential of these robots to handle multiple tasks, promising flexibility and cost-efficiency in businesses.

Use cases

- In a warehouse environment, handling multiple tasks such as picking, packing and transporting goods
- Assisting in healthcare, performing various tasks such as delivering medical supplies, assisting patient mobility or even disinfecting spaces
- In field servicing, inspecting equipment, performing routine maintenance and repairing breakdowns in remote or hazardous environments

”

Robots, working with humans, must be able to work in an environment designed for humans. That doesn't necessitate a human form: The most successful polyfunctional robots will not replicate the human shape — they will improve upon it.



Bill Ray
Distinguished VP Analyst, Gartner



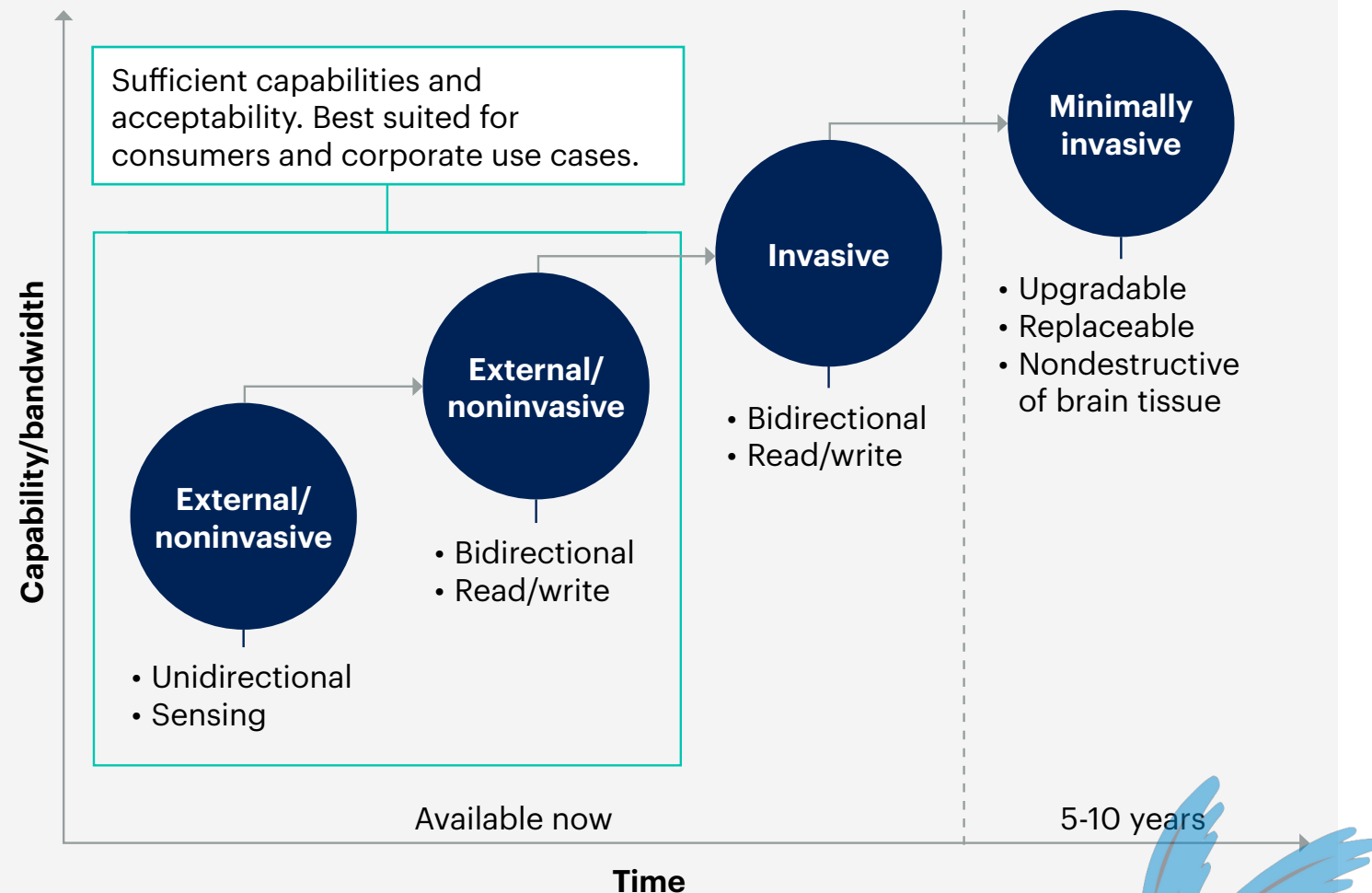
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Neurological Enhancement

Neurological enhancement is the process of improving a human's cognitive abilities using technologies that read and decode brain activity and optionally write to the brain.

For more on how it works and how to get started, read: [“What Is Neurological Enhancement?”](#)

How Brain-Machine Interface Capabilities Will Evolve



Source: Gartner



Neurological Enhancement

Gartner predicts

By 2030, 60% of IT workers will be enhanced by, and dependent on, technologies such as bidirectional brain-machine interfaces (BBMIs) — both employer- and self-funded — that are on the rise in 2024.

Source: Gartner

Why trending?

Neurological enhancement is trending due to its potential to enable brain transparency, revolutionizing healthcare. As AI rapidly evolves, businesses are exploring brain-machine interfaces to help workers upskill and stay competitive by enhancing cognitive abilities. It's also being looked at to create deeper, personalized consumer experiences and interactions through next-generation marketing tactics.

Use cases

- Reducing trainee surgeons' residency duration by a full year
- Personalizing educational material for students in real time
- Reducing workplace accidents and injuries, and industrial disasters
- Improving recruitment and retention by identifying compatible colleagues via neurodata

”

Imagine a job interview done with a brain interface, in two minutes. Neurological enhancement enables organizations to know how a person feels. It can also have some inputs to the brain, to stimulate employees into being more relaxed or more focused for better productivity. Capabilities will evolve, but existing solutions can give you an edge today.



Sylvain Fabre
Senior Director Analyst, Gartner



Understanding the trends is just the **first step**

Take the next step and learn how to drive real business value from these technologies in the **2025 CIO Agenda** guide. Get insight to more effectively align your leadership priorities, optimize technology investments and ensure timely tech deployment — all of which contribute to achieving strategic business objectives.

[!\[\]\(c507f772dba2b921f86777f01218e570_img.jpg\) Learn More](#)



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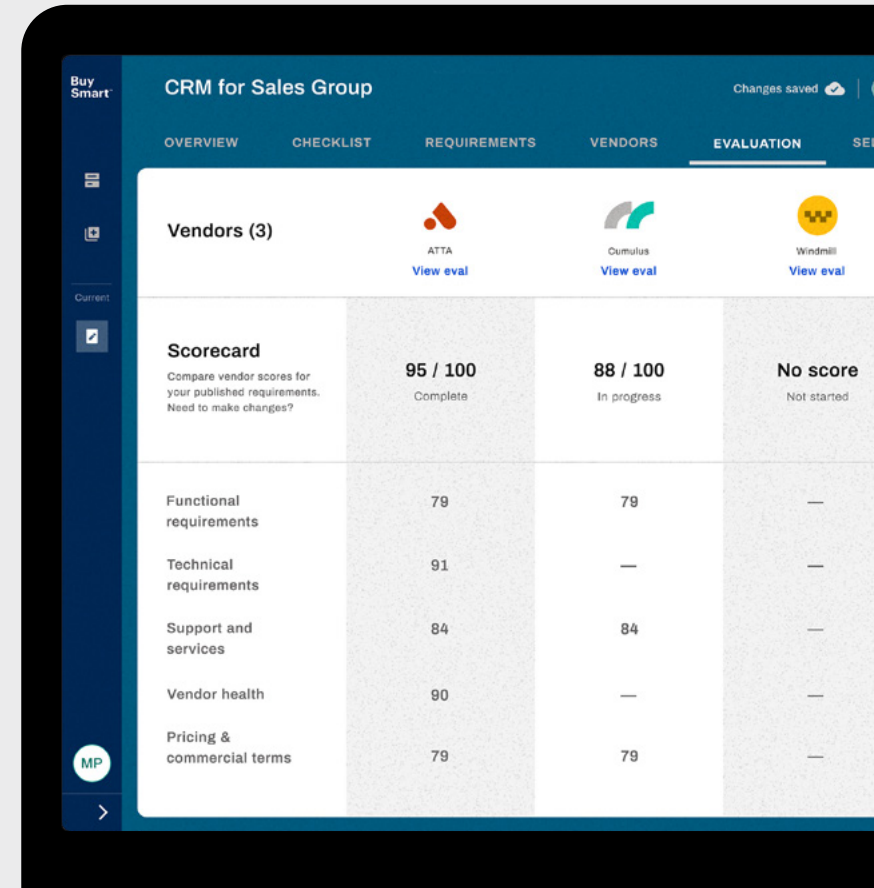
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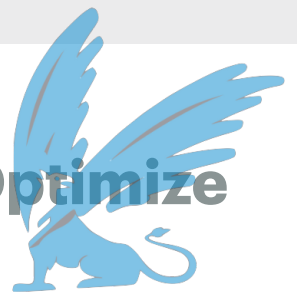
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