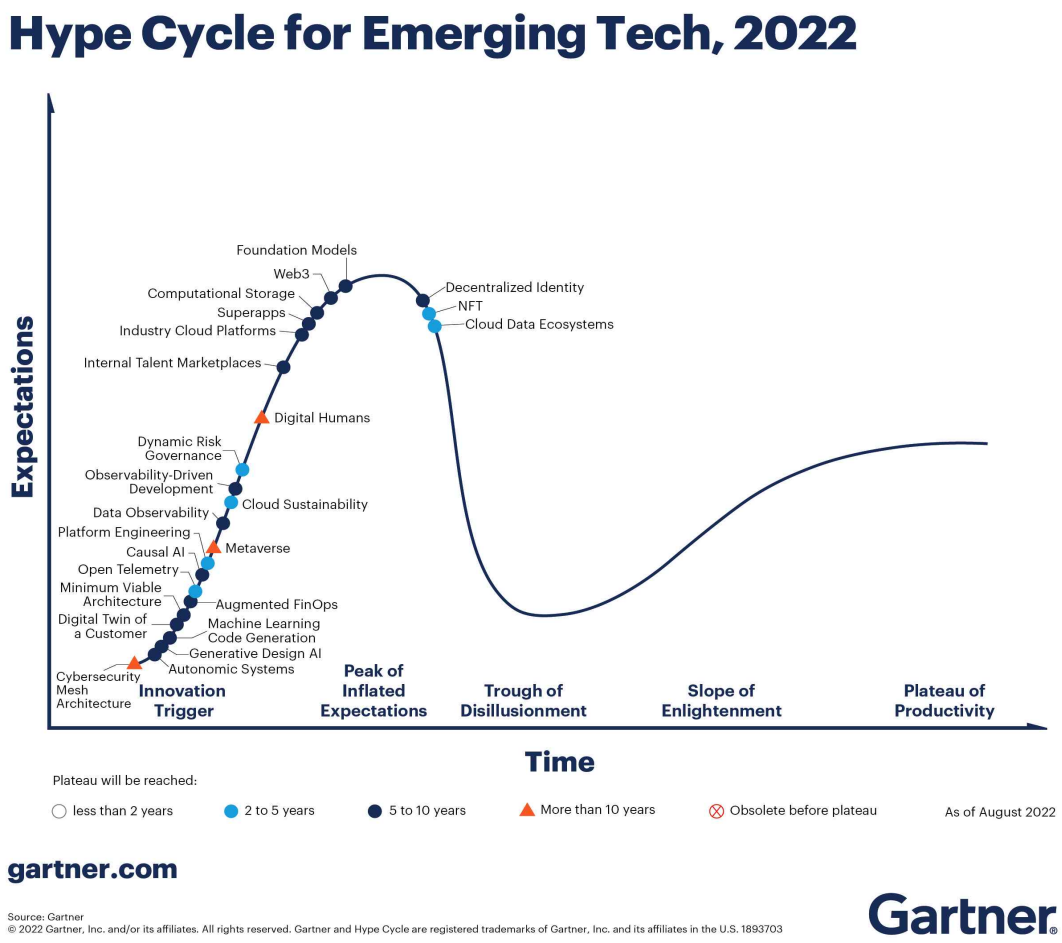
What's New in the 2022 Gartner Hype Cycle for Emerging Technologies

Emerging technologies for 2022 fit into three main themes: evolving/expanding immersive experiences, accelerated artificial intelligence automation, and optimized technologist delivery.
The 2022 Gartner Hype Cycle identifies 25 must-know emerging technologies designed to help enterprise architecture and technology innovation leaders:

- Expand immersive experiences
- Accelerate artificial intelligence (AI) automation
- Optimize technologist delivery

These technologies are expected to greatly impact business and society over the next two to 10 years, but will especially enable CIOs and IT leaders to deliver on digital business transformation.

Emerging technologies are disruptive by nature, without a well-known or proven competitive advantage. To capture the opportunities, it's critical to understand the potential use cases and the technologies' paths to mainstream adoption — which can be as little as two years or as long as 10 years or more.
"All these technologies are at an early stage, but some are at an embryonic stage, and great uncertainty exists about how they will evolve. The embryonic technologies present greater risks for deployment but potentially greater benefits for early adopters, which differentiates them from Gartner's top strategic technology trends," says Melissa Davis, VP Analyst at Gartner.



Three Hype Cycle themes to think about in 2022 and beyond

The 2022 Gartner Hype Cycle features emerging technologies and distills insights from more than 2,000 technologies into a succinct high-potential set. Most technologies have multiple use cases but enterprise architecture and technology innovation leaders should prioritize those with the greatest potential benefit for their organization. (They will also need to launch a proof-of-concept project to demonstrate the feasibility of a technology for their target use case.)

Here's more about the three themes under which the 2022 technologies fall:

Theme 1: Evolving/expanding immersive experiences

The benefit of these technologies is that they provide individuals with more control over their identities and data, and expand their range of experiences into virtual venues and ecosystems that can be integrated with digital currencies. These technologies also provide new ways to reach customers to strengthen or open up new revenue streams.

Digital twin of the customer (DToC) is a dynamic virtual representation of a customer that simulates and learns to emulate and anticipate behavior. It can be used to modify and enhance the customer experience (CX) and support new digitalization efforts, products, services and opportunities. DToC will take five to 10 years until mainstream adoption but will be transformational to organizations.

Other critical technologies in immersive experiences include the following:

- **Decentralized identity**(DCI) allows an entity (typically a human user) to control their own digital identity by leveraging technologies such as blockchain or other distributed ledger technologies (DLTs), along with digital wallets.

- **Digital humans** are interactive, AI-driven representations that have some of the characteristics, personality, knowledge and mindset of a human.

- **Internal talent marketplaces** match internal employees and, in some cases, a pool of contingent workers, to time-boxed projects and various work opportunities, with no recruiter involvement.

- Metaverse is a collective virtual 3D shared space, created by the convergence of virtually enhanced physical and digital reality. A metaverse is persistent, providing enhanced immersive experiences.

- Non-fungible token(NFT) is a unique programmable blockchain-based digital item that publicly proves ownership of digital assets, such as digital art or music, or physical assets that are tokenized, such as houses, cars or documents.

- **Superapp** is a composite mobile app built as a platform to deliver modular microapps that users can activate for personalized app experiences.

- **Web3** is a new stack of technologies for the development of decentralized web applications that enable users to control their own identity and data.

Theme 2: Accelerated AI automation

Expanding AI adoption is a critical way to evolve products, services and solutions. It means accelerating the creation of specialized AI models, applying AI to the development and training of AI models, and deploying them to product, service and solution delivery. Outcomes include more accurate predictions and decisions and the faster capture of expected benefits. The role of humans is also more focused on being consumers, assessors and overseers.

Autonomic systems are examples of accelerated AI automation. They are self-managing physical or software systems, performing domain-bounded tasks that exhibit three fundamental characteristics: autonomy, learning and agency. When traditional AI techniques aren't able to achieve business adaptability, flexibility and agility, autonomic systems can be successful in helping with implementation. Autonomic systems will take five to 10 years until mainstream adoption but will be transformational to organizations.

Other critical technologies in accelerated AI automation include the following:

- **Causal artificial intelligence (AI)** identifies and utilizes cause-and-effect relationships to go beyond correlation-based predictive models and toward AI systems that can prescribe actions more effectively and act more autonomously.

- **Foundation models** are transformer architecture-based models, such as large language models, which embody a type of deep neural network architecture that computes a numerical representation of text in the context of surrounding words, emphasizing sequences of words.

- **Generative design AI** or AI-augmented design, is the use of AI, machine learning (ML) and natural language processing (NLP) technologies to automatically generate and develop user flows, screen designs, content, and presentation-layer code for digital products.

- **Machine learning code generation** tools include cloud-hosted ML models that plug into professional developer integrated development environments (IDEs), which are extensions that provide suggested code based on either natural language descriptions or partial code fragments.

Theme 3: Optimized technologist delivery

These technologies focus on key constituents in building a digital business: product, service or solution builder communities (like fusion teams) and the platforms they use. These technologies provide feedback and insight that optimize and accelerate product, service and solution delivery and increase sustainability of business operations.

Cloud data ecosystems exemplify optimized technologist delivery. They provide a cohesive data management environment that ably supports the whole range of data workloads, from exploratory data science to production data warehousing. Cloud data ecosystems provide streamlined delivery and comprehensive functionality that is straightforward to deploy, optimize and maintain. They will take two to five years until mainstream adoption and will be highly beneficial to users.

Other critical technologies in optimized technologist delivery include the following:

- **Augmented FinOps** automates traditional DevOps concepts of agility, continuous integration and deployment, and end-user feedback to financial governance, budgeting and cost optimization efforts through the application of AI and machine learning (ML) practices.

- **Cloud sustainability** is the use of cloud services to achieve sustainability benefits within economic, environmental and social systems.

- **Computational storage**(CS) offloads host processing from the main memory of the central processing unit (CPU) to the storage device.

- Cybersecurity mesh architecture(CSMA) is an emerging approach for architecting composable, distributed security controls that improve overall security effectiveness.

- **Data observability** is the ability to understand the health of an organization's data landscape, data pipelines and data infrastructure by continuously monitoring, tracking, alerting, analyzing and troubleshooting incidents.

- Dynamic risk governance(DRG) is a new approach to the critical task of defining the roles and responsibilities for risk management. DRG customizes risk governance appropriately to each risk, enabling organizations to better manage risks and lower the cost of assurance.

- **Industry cloud platforms** leverage underlying SaaS, platform as a service (PaaS) and infrastructure as a service (IaaS) cloud services to offer industry-relevant packaged business and technical capabilities to an identified vertical as a whole product offering.

- **Minimum viable architecture**(MVA) is a standardized framework used by product teams to ensure the timely and compliant development, and iteration, of products.

- **Observability-driven development**(ODD) is a software engineering practice that provides fine-grained visibility and context into system state and behavior by designing systems to be observable.

- **Open Telemetry** is a collection of specifications, tools, application programming interfaces (APIs) and software development kits (SDKs) that describe and support the implementation of an open-source instrumentation and observability framework for software.

- **Platform engineering** is the discipline of building and operating self-service internal developer platforms (IDPs) for software delivery and life cycle management.

In short:

- The 2022 Gartner Hype Cycle™ for Emerging Technologies features 25 "must-know" innovations to drive competitive differentiation and efficiency.

- Only a few are likely to reach mainstream adoption in as little as two years; many will take 10 years or more.

- The embryonic nature of the technologies makes them more risky to deploy, but the benefits for early adopters are potentially greater.